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ABSTRACT

The results of six studies concerning medical school faculty and clinical research personnel are presented. The studies concern: (1) career research productivity of physician faculty; (2) accession and attrition of medical school faculty who are recent physician graduates; (3) comparison of training programs for physician scientists; (4) the research involvement plans of 1980 MD graduates; (5) national estimates of U.S. medical faculty for 1975-1976 through 1977-1978; and (6) projections of replacement needs for medical school faculty, 1980-1990. Specific considerations include: estimated annual publication rates of MD faculty by specialty and career age; longitudinal estimates of the proportions of successive graduating classes of medical students who become faculty members at U.S. medical schools; plans of 10,000 medical school seniors concerning research fellowships and careers and factors that influence those plans; annual medical faculty accession (first-time hiring) and loss (death, retirement) by rank and department during 1976 to 1978; predicted age distributions of all full-time faculty members through 1990; and rates of faculty accession, research involvement, competitive grant success, and research publication for graduates of four physical science training programs. (SW)

National Institutes of Health

Program Evaluation Report

ON THE STATUS OF MEDICAL SCHOOL FACULTY AND CLINICAL RESEARCH MANPOWER

1968 - 1990

A Report to

The Clinical Sciences Panel of the
Committee on a Study of National Needs for Biomedical
and Behavioral Research Personnel

National Academy of Sciences
National Research Council

April 30, 1981

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ON THE STATUS OF MEDICAL SCHOOL FACULTY
AND
CLINICAL RESEARCH MANPOWER
1968-1990

EXECUTIVE SUMMARY

The National Research Council's Committee on a Study of National Needs for Biomedical and Behavioral Research Personnel has outlined several key issues pertaining to the training of clinical investigators. In 1978 the Clinical Sciences Panel of the Committee posed a number of questions basic to an understanding of the major issues.

The Association of American Medical Colleges was contracted by the Panel to address the questions, printed below in italics. Brief summaries of key findings follow each question. Reference is also made to the chapters and exhibits (figures and tables) in this report that present a complete description of pertinent data and analyses.

A. *Pertaining to the supply of MD clinical investigators:*

1. *NIH data (reported by NRC) indicate a decline in numbers of physicians entering clinical research training since 1974. AMA data on physicians' practice activities tend to confirm that fewer physicians are now engaged in research and teaching. Is the apparent decline in numbers of MD clinical investigators on medical faculties confirmed by data available to AAMC?*

Chapter III reviews several indicators of the trends of physician involvement in teaching and research. Indicators of physician research suggest several possible trends. Data from the AMA show a decline in the number of physician researchers from 1970 to 1975, however, these same data show this trend to be reversing in the years 1975 through 1978. These data also show an increase in the number of physicians teaching during the years 1970 through 1978.

Based on reporting to the Faculty Roster, MD full-time faculty involvement in research has not declined since 1974. The percent of research involvement has increased slightly as shown in Exhibit III.23 with 58.5 percent MD faculty involvement in 1974-75, 63.8 percent in 1976-77, and 61.6 percent in 1977-78. (The 2.3 percent decline from 1976-77 to 1977-78 may be only a reflection of late reporting by six research oriented medical schools. Currently these faculty records are being updated).

Section B of Chapter III examines successive MD graduating classes for members who received appointments at a medical school and also made research grant applications to NIH. This analysis, based on limited data, shows a decline in grant applications from members of the more recent classes (Exhibit III.1). A method for a more complete analysis is proposed. Section C utilizes the Faculty Roster to prepare a profile of faculty from successive graduating classes. It includes an analysis of their research responsibilities (Exhibit III.21) which shows slightly lower research responsibilities for

more recent classes. Since these classes are of different maturities, however, it is not clear from these data whether an actual decline in ultimate research involvement is indicated.

These indicators fail to give a consistent picture of the trends of physician research activity. NIH data show a decline in the number of physicians entering research training. However, a decline in numbers of MD clinical investigators on medical faculties is not confirmed by data available to AAMC.

2. *Is the fraction of medical school graduates entering medical faculty employment increasing, decreasing, or remaining constant?*

Chapter III presents an analysis of the proportions of medical school graduates from the classes of 1967 through 1974 that joined medical school faculties. The proportion varies from class to class during the first six years after graduation. However, in later years these differentials are greatly reduced. Within nine years of graduation about 15 percent of an MD class has attained a medical school faculty appointment. Aside from the early variability in the proportions appointed, the fraction of medical school graduates from successive classes entering medical faculty employment is roughly constant.

Proportionally more female than male medical school graduates enter medical faculty employment. Female graduates also join faculty sooner than male graduates. For the four classes for which 10 years have

elapsed (1967 through 1970), 22 percent of the females and 15.7 percent of the males received a faculty appointment. Of these faculty, 55 percent of the females and 40 percent of the males had been appointed within five years of graduation (Exhibit III.13). The difference in female accession to faculty positions is compounded by the fact that the female attrition rate is lower than the male attrition rate for each of the years studied (Exhibit III.15).

3. *Are clinical faculty vacancies relatively more numerous than basic science medical faculty openings?*

- Chapter VI shows that there is a large number of faculty position vacancies in clinical departments, and this number of vacancies is increasing. However, the data also show that the proportions of vacancies among both budgeted and filled positions were nearly the same for clinical and basic science departments. The proportions for clinical departments were never more than seven percent greater than proportions for basic science departments.

4. *Is there an alternative to the NRC supply/demand concept of "shortage" in clinical research manpower? If so, how does such an alternative compare to the supply/demand model? Is another model preferable?*

5. *What data can be gathered that support the NRC Committee's demand model projections?*

- Section J of Chapter II compares the NRC "demand" model with a model developed in this report. Both models project future need for new faculty members, but they differ in their assumptions, definitions and methods. The AAMC model incorporates age-specific

rates of faculty hiring and loss and focuses on faculty holding the MD degree and regular appointments. The AAMC model projects lower numbers of MD's on faculty, but larger numbers of new MD faculty needed for growth and replacement than does the NRC model. The AAMC model also estimates the effects of various growth rates on research output by physician faculty in five specialty groups.

B. *Pertaining to the prospective characteristics and future clinical research potential of U.S. medical school faculties:*

1. *What is the profile of research productivity of MD faculty throughout their careers?*

2. *What is the profile of academic medical research careers?*

A large sample of medical school MD faculty were surveyed to discover the time they spend each week in their research and academic activities, their research productivity as measured by output of publications (both total publications and publications in selected research journals) and selected personal data (e.g., age). Analyses of these data are reported in Chapter II and, in summary, show:

- Faculty physicians in the clinical specialties spend highly variable amounts of time in research although their work weeks are relatively uniform. As both clinical and basic science MD faculty grow older they spend less time in research and more time in administration unrelated to research.

- Younger MD faculty in basic science departments and most clinical departments report they are spending more time in delivering patient care than do their older colleages.

- Research productivity profiles between specialty groups are highly variable, but consistent patterns emerge:

(1) A definite era effect is observed in that physicians graduating between 1944 and 1952 began to produce research publications at a more slowly increasing rate than did all later cohorts. Later cohorts show a sharp rise in publication activity beginning about five years after receipt of the MD.

(2) Medical specialists show high, sustained levels of productivity reaching a plateau about 14 years after receipt of the MD (age 39).

(3) One-third of basic science physicians have both MD and PhD degrees. Their productivity peaks at about age 40 to 45, falls and rises again later in their careers.

(4) Surgical, behavioral, and hospital-based specialists have sharp rises in productivity followed by levels falling to near zero by mid-career.

(5) Behavioralists (psychiatrists) spend less time in research per week and have lower peak research productivity than all other specialty groups.

- The conferring of tenure has no discernible effect on research productivity.

3. *Are medical faculties aging or "graying?" Are they becoming less mobile? If so, what are the implications, if any, for research productivity?*

4. *How might the age composition of the current pool of clinical investigators affect projections of need?*

In Chapter II, age-distribution data were developed about physician faculty. These data show:

- Based on an analysis of MD faculty in selected departments and excluding instructors, MD faculty in different specialty groups are seen to be "graying" at different rates. (While relative comparisons among specialty groups are valid, the estimated absolute rates of "graying" during the past decade may be influenced by an artifact of the Faculty Roster System). Projections for the decade 1980 to 1990 indicate that the aging can be prevented if the current six percent growth rate is maintained. At zero growth all groups of MD faculty, especially those in the basic science departments, will age rapidly.

- If the faculty continues to grow at six percent per year, the number of MDs needed for faculty replacement and growth (at assistant, associate and full professorial ranks) will rise from about 2,700 annually in 1978 to about 5,500 annually in 1990. If the growth rate falls to three percent per year, the number of MDs needed will rise from 2,000 to 2,900 per year.

If there is no growth in total faculty in the next decade the number of MDs needed to replace those leaving faculties will remain constant at about 1,300 per year.

- Data relating to research productivity and age distribution were combined for MD faculty who received their MD degrees between 1944 and 1972, and projections were made of MD faculty research output for the decade 1980 to 1990. If medical school faculties grow at six percent per year, research output (Measured by research publications) will increase 100 percent; at three precent growth, production will rise 38 percent. A more likely scenario, steady state or zero growth, will result in a seven percent decrease in research production by physicians.

- Projections of research output, adjusted for a reduced proportion of new physician faculty having had research training, show lowered numbers of research publications. Under the assumption of zero growth in faculty size, annual "selected research" output by physicians in all specialties will decline 15.5 percent by 1990. The decline will be greatest in basic sciences, 22.8 percent, and in surgical specialties, 26.7 percent (Exhibit II.62).

- Projections of replacement need for all full-time faculty are shown in Chapter VII.

  - The age composition of the total full-time faculty during 1980-1990 is shown given a continued six percent rate of growth, a three percent rate of growth, and a leveling of

the growth rate to zero percent. The result of faculty growth on the age composition of faculty are presented for these varying growth rates and projections of the future need for new faculty appointments.

- If there is no growth in faculty size, the projected age distributions of the faculty show it becoming substantially older. Under these conditions, the projected need for new full-time faculty declines from about 2,900 in 1980 to a stable level of about 2,600 per year from 1985 to 1990.

- A future growth in the faculty at a rate of three percent per year showed a moderate aging in the faculty and the need for new faculty increasing from about 4,400 in 1980 to about 5,800 in 1990.

- If the number of faculty continues to grow at the recent rate of six percent per year, the projected age composition of the faculty will change little. Under these conditions, the projected need for new full-time faculty will increase from about 5,900 in 1980 to 10,600 in the year 1990 (Exhibit II.63).

C. *Pertaining to incentive/disincentives for young physicians to opt for a career in clinical research and academic medicine what are the important incentives and disincentives for research, the conscious or unconscious selection processes, etc.?*

Analysis of the AAMC Graduation Questionnaire (Chapter V) suggests:

- Opportunity to work in the academic community and the challenge of the search for new knowledge are major incentives for research-oriented students.

- Research experience while a pre-medical or medical student has a relatively strong influence on all students, including those who select practice as well as research careers.

- Perceived societal need for practitioners appears to be the strongest disincentive to research careers.

- Perceived availability of research training support is of moderate importance to those who will pursue research.

- Financial factors such as debt, "payback" and lower incomes of faculty members appear to have minimal influence on expectations of a research career.

- Faculty frustrations and uncertain research funding are also minor factors affecting career choice.

Other data from the Graduation Questionnaire show that:

- Twenty-eight percent of the 1980 graduates plan to seek a research fellowship.

- About 21 percent of each graduating class in 1978, 1979, and 1980 expect research to be a part of their careers. This is much less than the 39 percent of the class of 1960 who had such expectations.

- Students graduating from joint MD-PhD programs express plans for research careers at double the rate of PhDs-turned-MD (95 percent and 53 percent, respectively). Since there are more than twice as many PhD-MDs as MD-PhDs, the resulting numbers (national estimates) of the two groups who have research career plans are roughly equal (122 MD-PhDs and 139 PhD-MDs). Of the remaining new MDs, who do not also hold PhD degrees, 21 percent (about 3,000 nationally) would like to become involved in research.

- There is considerable change in research career attitudes between matriculation and graduation at all medical schools, but the net change is "toward" research at research intensive medical schools.

D. *It has been suggested that PhDs can substitute in clinical research for MD investigators. Pertaining to this issue, what is the current balance of MDs and PhDs in clinical departments? Can any trends in this balance or in the mix of appointment types be detected?*

- Chapter VI provides a summary table of the clinical departmental balance of MDs and PhDs for the three years, 1975-1978. The fraction of MDs in the clinical departments vis a vis PhDs has remained fairly constant. The departments of Pediatrics, Family Practice, Obstetrics-Gynecology, and Radiology show a gain in numbers over this period of time, but the MD and PhD faculty balance remains approximately the same.

- In a few departments, Anesthesiology, Medicine, Neurology, and Public Health, the increase in participation by PhD faculty appears to be due to their replacing non-doctoral and other health related faculty rather than MD faculty.

- By rank, the gains in PhD appointments are primarily at the Assistant Professor and Instructor level (Exhibit VI.1).

The following questions reflect another issue of continuing concern to the Panel -- that of optimal research training modalities.

Which research training program for clinical investigators has the highest yield of physicians staying in research? What "performance" measures can be examined?

Chapter IV presents a comparison of four NIH supported programs that provide research training for physicians: The NIGMS Medical Scientist Training Program (MSTP), the intramural NIH research associates and clinical associates programs and the extramural traineeship program. The first 53 graduates of the MSTP served as the reference group and 53 participants in each of the three other programs were carefully matched on the basis of medical school entry and measured ability. Comparisons of the four groups showed that:

- Given comparable research trainees, all four programs were highly successful in producing physician scientists but the MSTP was most successful in research retention.

- Extramural trainees, who received support before research service "payback" was instituted, maintain a high level of academic involvement. Of those matched trainees who could be located, 83 percent were involved in academic research or teaching (Exhibit IV.2). The data of this comparison sample were corroborated by a match of those who ever received NIH research training support with the AAMC Faculty Roster (Exhibit IV.6). Over several decades NIH extramural research fellowship support has produced researchers and teachers in 62 percent to 83 percent of all those who ever received such support.

- By 1981, a significantly larger proportion of MSTP graduates than other research trainees had acheived tenured ranks. By 1981, 42 percent of the MSTP graduates who had joined faculties were tenured, compared with 17 percent of research associates and extramural trainees and four percent of clinical associates (Exhibit IV.3).

- On balance, research grant success rates do not discriminate among the four groups. The MSTP, clinical associate and extramural training graduates have higher approval rates and better average priority scores than the rate and average for all medical school faculty. Based on only a small number of applications, the performance of research associates was mixed: a low approval rate but excellent average priority scores assigned to approved applications (Exhibit IV.4).

- Publication performance for graduates of the four training programs show marked differences in quantity and research "level." MSTP graduates are the most prolific contributors to the scientific literature. Matched graduates of the MSTP program had published 995 articles by 1981, compared with 716 articles by research associates, 673 by clinical associates and 408 by extramural trainees (Exhibit IV.5).

- MSTP graduates and matched research associates published predominately (78 percent and 62 percent, respectively) in journals that report basic research and clinical investigation. Clinical associates and extramural trainees publish at all research "levels" but mostly in journals that carry a mix of clinical investigation and clinical observations articles (Exhibit IV.5).

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The authors gratefully acknowledge the contributions of other individuals to this research effort.

Francis Narin of Computer Horizons, Inc., freely supplied names, name abbreviations and other data about thousands of research journals. Eugene Rosenthal and David Pastan coded 24,449 article and book references listed on 574 Curriculum Vitae supplied by physician faculty who responded to our survey.

The comparison of four research training programs for physicians entails contributions of data and skills by a number of people. Dr. Jay Shapiro of the NIH Clinical Center supplied the names of NIH Research Associates and Clinical Associates. Dr. William Batchelor of NIH and Dr. Allen Singer of the National Research Council provided a tape with records of NIH extramural trainees. After a computer searched the rosters for names of physicians who entered medical school with the first fifty-three Medical Scientist Training Program graduates, Cynthia Withers sifted through dozens of archived, printed records of Medical College Admissions Test (MCAT) scores to match individuals from each of the four programs whose scores were equivalent. Mary Compagnucci at the National Research Council extracted grant application data for all of the selected physicians from the NIH Consolidated Grant Applicant File. Publication data for all of the selected physicians were extracted from the MEDLARS system by Carolyn Tilley at the National Library of Medicine. Dr. Edward Zapolski of Georgetown University School of Medicine verified the authorship of the 8,800 MEDLARS-derived references and deleted references by other authors having the same last names as our selected physicians. Aarolyn Galbraith

derived Faculty Roster System records of those who are or have been on faculties of U.S. medical schools. Dr. Martha Anderson collated the data from these sources for the comparison of the four research training programs.

Faculty chronological age and career age area-graphs were drawn by Beverly Anderson. Career-long productivity profiles were drawn on an Agile terminal using a computer program adapted by Dr. Michael McShane, Director of AAMC Computer Services.

While the cooperation of these and other individuals is gratefully acknowledged, the authors alone share the responsibility for any errors that may have occurred. Without prompt help when it was needed, however, this work could not have been completed on schedule.

I. INTRODUCTION AND OVERVIEW

The National Academy of Sciences' Committee on a Study of National Needs for Biomedical and Behavioral Personnel is charged with the task of assessing the Nation's need for research personnel and recommending modifications to current research training programs to meet the assessed needs. Clinical research is an area drawing increasing attention and concern. Available data suggest a large loss of physicians trained in research and therefore, potentially, a loss in the Nation's ability to perform research that directly affects the transfer of research findings to the practice of medicine.

The Clinical Sciences Panel of the Committee has identified several key issues and raised questions that require answers if the Committee is to fulfill its charge in recommending adequate training opportunities and incentives to supply the Nation with an adequate supply of clinical investigators. Consequently, the Panel asked the Association of American Medical Colleges (AAMC) to prepare and provide certain clinical research manpower data and analyses that address the key issues the Panel identified.

This report presents six studies to the Panel and the Committee for their use in elucidating and averting potential shortages of clinical research personnel. The six studies are presented in the following chapters:

Chapter II: Career Research Productivity of Physician Faculty

This chapter presents estimates of annual publication rates of MD faculty, by specialty and career age (elapsed time since MD); projections of changing career age distributions of MD faculty through 1990; and projections of future research publication output by MD faculty, by specialty, annually through 1990, under several assumptions of growth or stasis in total faculty size. Projections of numbers of MDs needed for faculty replacement and growth is compared with estimates from the NRC "demand" model.

Chapter III: Accession and Attrition of Medical School Faculty Who Are Recent Physician Graduates

This chapter presents longitudinal estimates of the proportions of successive graduating classes of medical students who become faculty members at U.S. medical schools. The elapsed times to faculty accession and attrition are included. Also presented are estimations of the percentages of successive classes who apply to NIH for research support.

Chapter IV: Comparison of Training Programs for Physician Scientists

Four matched sets of graduates of the Medical Scientist Training Program, the NIH Research Associates program, the NIH Clinical Associates program and NIH Extramural Trainees are compared. Their rates of faculty accession, research involvement, competitive grant success and research publication are compared.

Chapter V: MD Graduates of 1980 and their Plans for Research Involvement.

This chapter analyzes responses of ten thousand medical school seniors to the AAMC 1980 Graduation Questionnaire. Plans for research fellowships and careers and factors that influence those plans are assessed.

Chapter VI: National Estimates of Faculty Manpower in U.S. Medical Schools 1975-76 through 1977-78.

This chapter introduces extensive tables of medical faculty accession (first-time hiring) and loss (death, retirement and other reasons) by rank and department for each year from 1976 to 1978. The tables extend those published previously for 1971 to 1975.

Chapter VII: Projections of Replacement Needs for Medical School Faculty, 1980-1990.

This chapter forecasts the age distributions of all full-time faculty members (all degree teypes) through 1990 under assumptions of six percent growth, three percent growth and no growth in total number of faculty members. From these changing age distributions, estimates are made of the numbers of new faculty members that will be needed.

II. CAREER RESEARCH PRODUCTIVITY OF PHYSICIAN FACULTY

A. Purpose

The purpose of the study reported here is to assess the recent biomedical research productivity of scientists holding the MD degree as measured by the output of publications. Using this derived measure of productivity a second objective is to predict the future research output by physician investigators from 1980 through 1990.

B. General Overview of Method

It was assumed for purposes of this study that the population of physician researchers is and will continue to be confined to U.S. medical schools and their related teaching hospitals. Based on this assumption five faculty groups were defined: medical specialists, surgical specialists, behavioral specialists, hospital-based specialists and basic scientists. These groups of physicians were further subdivided into seven classes according to the year in which the MD was received. The combination of the specialty groups and the classification as to year of award of the MD produced the sampling frame shown in Exhibit II.1. The number of physicians in each of the sample cells is shown: from each cell 50 names were drawn at random. A questionnaire (Exhibit II.7) was sent to 40 of the physicians in each of the cells so defined. Ten names in each cell were reserved and used as replacements for questionnaires returned undelivered by the Postal Service. Each physician was also asked to supply a Curriculum Vitae (C.V.) including a list of publications. Follow-up contacts with non-respondents were made until at least 20 responses had been obtained in each cell.

The list of published articles and books obtained from the C.V. of respondents were entered in a computer file, along with a classification

of each article according to the "research level" characteristic of the journal in which it appeared. This computer listing of publications allowed the construction of career productivity profiles of each specialty group. In addition, year of graduation information about the population of physician faculty allowed an examination of recent changes in "career age" distribution (in years after MD) among faculty members. Based upon the changes in this age distribution over the years 1968-78, a projection was made of the relative ages of MD faculty between 1980 and 1990. The combination of this career age projection and the publication output allowed us to make projections of the publication output and therefore, by inference, the research productivity of faculty members in U.S. medical schools over the next decade.

The following sections give a more detailed description of each of the steps employed in this work.

C. Definition of the Physician-Research Population

The population for study was defined as all physicians listed on the AAMC Faculty Roster System in 1979. This population includes full-time salaried and volunteer faculty members holding the MD degree in the regular faculty ranks. This population excludes instructors and all faculty with clinical appointments only. The assumption was made that the population of physician-researchers is and will continue to be confined to physicians on the faculties of U.S. medical schools and teaching hospitals. No tests were made of the basis or validity of this assumption, since the purpose was not to measure all physicians who conduct research, but rather to create a frame from which a representative random sample of the physician-researchers could be drawn.

1. Definition of the Sampling Frame. The population of physician-researchers were divided into 5 specialty groups according to their faculty departmental affiliation as follows:

1. Medical specialties (pediatrics, internal medicine, allergy, neurology, etc.)
2. Surgical specialties (surgery, orthopedics, obstetrics and gynecology, urology, etc.)
3. Behavioral specialties (psychiatry)
4. Hospital based specialties (anesthesiology, pathology, radiology)
5. Basic sciences (anatomy, biochemistry, physiology, public health, pharmacology, microbiology, etc.)

The groups of faculty specialists were defined according to their primary appointment in U.S. medical schools. If a physician had a primary appointment in an administrative arm (e.g., in the dean's office) that administrative function was ignored and the secondary department appointment was used to define the specialists class to which that individual was assigned.

These groups of physicians were further subdivided into seven classes according to the year in which the MD degree was received:

1. MD received before 1944,
2. MD received between 1944 and 1952,
3. MD received between 1953 and 1957,
4. MD received between 1958 and 1962,
5. MD received between 1963 and 1967,
6. MD received between 1968 and 1972, and
7. MD received after 1972.

There were 24,946 physicians in the Faculty Roster System with qualifying ranks. Exhibit II.1 shows the number of physicians in each of the cells defined by era of graduation. Those cells bordered by the heavy line constituted the sampling frame. As will be noted from Exhibit II.1 a sizeable fraction of total faculty (13.3 percent) were excluded from the sampling frame. Those who received MD degrees before 1944 (end of World War II), 7.4 percent, were excluded due to the high probability that their research career preparation was significantly different from those trained after World War II. Likewise, those receiving degrees after 1972, 5.4 percent, were judged to have been on faculties for so short a time as not to have compiled significant numbers of publications to be of use in this project. Finally, a small number of faculty showed departmental assignments which were either highly unusual or otherwise unclassifiable (0.6 percent). Exhibit II.2 shows the distribution of MD faculty in the sampling frame by specialty group.

Exhibit II.3 shows the mean age of physicians in each of the 25 cells of the study population, and Exhibit II.4 indicates the percentage of individuals at each academic rank within the 25 cells. Age distributions were not significantly different between groups of specialists; however, there were significant differences in the distribution by rank within both specialty groups and the era of graduation. Not surprisingly the largest number of full professors were found in the earliest graduating groups and conversely the largest number of assistant professors were found in the most recent years of graduates. (The rank of instructor was not included in the sampling frame because of the variability between medical schools of the use of this faculty rank designation.)

Exhibit II.5 indicates the percentage of physicians in each cell who also had a PhD degree. Not surprisingly, the largest percentage (about one-third) in each graduation cohort who had both MD and PhD degrees were in basic science

EXHIBIT II.1

PHYSICIAN FACULTY SAMPLING FRAME

Specialty Group	Year MD Conferred						
	Pre 1944	44-52	53-57	58-62	63-67	68-72	Post 1972
Medical	688	1,608	1,654	1,995	2,351	2,318	662
Surgical	476	814	752	928	1,020	803	164
Behavioral	160	345	298	353	365	350	154
Hospital-Based	319	874	770	950	965	899	298
Basic Science	172	371	250	267	194	143	67
Miscellaneous	23	46	26	24	16	11	3

EXHIBIT II.2

MD FACULTY SAMPLING FRAME BY SPECIALTY GROUP

Specialty Group	Number of MD Faculty	Percent
Medical	9,926	46%
Surgical	4,317	20%
Behavioral	1,711	8%
Hospital-Based	4,466	21%
Basic Science	1,225	5%

EXHIBIT II.3

MEAN AGE OF PHYSICIAN FACULTY IN SAMPLING FRAME

Mean Age (Standard Deviation)

Specialty Group	Year MD Conferred				
	44-52	53-57	58-62	63-67	68-72
Medical	56.2 (2.97)	50.1 (2.33)	45.1 (2.56)	40.2 (2.55)	35.5 (2.27)
Surgical	56.2 (3.06)	50.0 (2.59)	45.2 (2.49)	40.2 (2.35)	35.9 (2.32)
Behavioral	57.0 (3.23)	50.6 (2.97)	45.7 (2.72)	40.8 (3.15)	35.8 (2.61)
Hospital-Based	56.4 (3.26)	50.4 (3.11)	45.7 (3.21)	40.3 (3.02)	34.7 (2.66)
Basic Science	57.2 (3.49)	50.8 (3.57)	46.1 (3.65)	41.2 (3.46)	36.8 (3.88)

EXHIBIT II.4

PERCENT OF PHYSICIAN FACULTY AT EACH ACADEMIC RANK

Specialty Group	Rank	Year MD Conferred				
		44-52	53-57	58-62	63-67	68-72
Medical	Prof	64.7	56.2	36.7	8.7	.8
	Assoc	21.4	28.9	39.5	43.2	10.9
	Asst	13.9	14.9	23.8	48.1	88.3
Surgical	Prof	69.4	59.4	37.7	10.0	.8
	Assoc	19.5	24.4	36.8	39.9	10.0
	Asst	11.1	16.2	25.5	50.1	89.2
Behavioral	Prof	55.4	46.1	29.9	11.3	1.2
	Assoc	22.6	29.1	32.2	30.1	13.4
	Asst	22.0	24.8	37.9	58.6	85.4
Hospital-Based	Prof	61.6	51.0	34.7	9.7	1.3
	Assoc	23.1	25.8	35.8	37.3	12.3
	Asst	15.3	23.2	29.5	53.0	86.4
Basic Science	Prof	83.6	74.8	54.1	27.4	9.9
	Assoc	12.9	17.6	37.0	39.1	25.1
	Asst	3.5	7.6	8.9	33.5	65.0

departments. Exhibit II.6 indicates the percentage of physicians who reported identifiable research post-doctoral experience to the Faculty Roster. The largest percentages (45-51 percent) of individuals who had identifiable post-doctoral research training graduated prior to 1962 and joined basic science departments. The second highest level of post-doctoral research experience was found in medical specialists in all eras. It is noteworthy, but not surprising, that less than 10 percent of recent graduates in behavioral specialties have had identifiable post-doctoral research training.

D. The Survey

Each of the 25 cells within the sampling frame described in Section C above was sampled randomly to provide 50 names from each cell, a total of 1,250 faculty. An initial mailing was sent to 1,000 faculty members, the first 40 faculty sampled from each cell, and there was a follow-up mailing a month later. If a questionnaire was returned because the faculty member was dead, had moved leaving no address, or was no longer in academic medicine, a new mailing was sent to one of the 10 remaining individuals in that cell. Of the 1,041 persons thus selected by our sampling procedure to receive questionnaires with requests for C.V.s, 57 were returned with an indication that the named physician was not a valid member of the defined survey population, e.g., was dead or no longer on the faculty. Of the remaining 984 physicians 610 (62.0 percent) responded to our survey by completing the questionnaire and 546 (55.5 percent) returned resumes which included their Curricula Vitae and list of publications. The corresponding numbers of successful mailings and response rate for each sampling cell are given in Appendix II.1.

We questioned whether the 610 respondents were similar to the 374 non-respondents with respect to their level of research effort and other

Exhibit II.5

PERCENT OF PHYSICIAN FACULTY HOLDING PhD DEGREE

Specialty Group	Year MD Conferred				
	44-52	53-57	58-62	63-67	68-72
Medical	6.9	6.3	6.3	4.8	4.7
Surgical	9.3	8.8	6.6	5.7	5.7
Behavioral	4.9	5.7	6.2	5.5	5.1
Hospital-Based	8.6	8.3	9.4	8.3	6.3
Basic Science	37.5	32.4	36.0	39.2	29.4

Exhibit II.6

PERCENT OF PHYSICIAN FACULTY REPORTING RESEARCH POST-DOCTORAL EXPERIENCE TO FACULTY ROSTER SYSTEM

Specialty Group	Year MD Conferred				
	44-52	53-57	58-62	63-67	68-72
Medical	35.1	40.7	40.9	40.4	37.7
Surgical	25.7	30.5	30.4	28.3	19.6
Behavioral	13.6	18.5	19.5	13.7	9.7
Hospital-Based	28.7	24.4	28.0	22.1	16.4
Basic Science	44.7	50.8	47.6	42.8	40.6

characteristics that could affect or be influenced by their research productivity. Appendix II.2 examines in detail the possibility that a bias was introduced into the sample population. To test for a possible bias between those who did and did not respond to our request, a proxy of known research involvement was needed for the entire sample. As detailed in the Appendix we used the "major responsibility" code for research from the Faculty Roster. In addition we used "RESIN," a numerical index derived from the Faculty Roster "major responsibility" codes by William E. Rhode, Ph.D., of the National Institutes of Health. Both the "major responsibility" codes and "RESIN" indicated that respondents to our survey had statistically higher levels of research responsibility than the non-respondents. There was no difference in age, or the presence or absence of additional advanced degrees between the two groups. Faculty from the higher academic ranks were more likely to respond to the survey (see Appendix II, Section 1), and this pattern is also statistically significant.

Our conclusion was that there was a possible bias in our survey tending to favor people with higher levels of research activity and of higher faculty rank. We expect that our survey results, therefore, should overestimate the research activity and productivity of physicians on medical school faculties to an unknown, but probably limited, extent. We judged the extent of overestimation to be minimal because the differences between the indices of research activites for respondents and non-respondents was small. Further, because the purpose of our study is to project the expected rate of change in future research output, career profiles and changing age distributions, the added numbers of research-involved faculty may actually increase the sensitivity of our measure of change in research output.

E. Research Involvement Questionnaire

The survey questionnaire is reproduced as Exhibit II.7. Questions in Category I were intended to provide data about the work week of the physicians sampled. It was assumed that when physicians were performing clinical duties on a virtually full-time basis (i.e., "on service"), their time for research activities would be constrained. Therefore item I-b sought information about such patient care activities. (Fifty-two percent of the respondents made an explanatory comment about their time "on service", so we could judge whether their other data were comparable.) The second category of questions (II) was intended to force responses into a form which would allow us to divide the professional work week hours into four categories:

a) hours spent in all forms of research and research-related activities

b) hours spent in teaching that was not research related,

c) hours spent in patient care that was not research related, and

d) hours spent in administration that was not research related.

It was intended that respondents should further sub-divide the hours reported in category II.A (research) into sub-categories indicating the number of research hours which involved teaching and also the number of hours which involved patient care. Despite field testing and several developmental iterations of the questionnaire form, 21.5 percent of individuals failed to respond to questions II.A-1 or II.A-2 regarding research related teaching and patient care. Data from these questions (II.A-1 and II.A-2) therefore should be regarded as less exact.

A final question (III) was intended to elucidate the percent of time which the individual faculty member had spent in all forms of research in the 1st, 5th, 10th, and 15th year on the faculty as applicable. Response rates for the first two of these estimates were very high, but dropped to 94 and 87 percent of applicable faculty for the 10 and 15 year estimates.

SURVEY OF RESEARCH ACTIVITY
OF ACADEMIC PHYSICIANS

EXHIBIT II.7

Academic clinicians typically engage in four or more concurrent activities: teaching, research, patient care, and administration. These activities are often carried out at the same time, but it is important for us to know how many hours per week you spend in research and research-related activities.

I. A. FOR THE WEEK JUST ENDED PLEASE ESTIMATE THE NUMBER OF HOURS YOU SPENT IN ALL PROFESSIONAL ACTIVITIES . . . . . ___HRS.
(If you were on vacation last week, estimate your latest work week).

B. Many academic physicians "attend on a clinical service" for a prescribed number of weeks per year. Were you "on service" for the week reported?___

How many weeks this year are you "on service"? ___wks.

Comments (if needed to clarify your response)_____

_____

_____

II. DIVIDE THE PROFESSIONAL WORK WEEK HOURS ESTIMATED IN I(A), ABOVE, FOR THE WEEK JUST ENDED INTO THE FOLLOWING FOUR CATEGORIES, AS DEFINED:

A. The hours you spent in all forms of RESEARCH (include bench and patient research, reading, writing, teaching research fellows and graduate students, and administration of research, e.g., time on human subjects review committee) . . . . . ___HRS.

Of these research hours how many also involved

1) teaching? _____ HRS.

2) patient care? _____ HRS.

Note: These two numbers may not be mutually exclusive nor sum to equal all hours spent in research.

B. The hours you spent primarily in TEACHING that is NOT research-related . . . . . ___HRS.

C. The hours you spent primarily in PATIENT CARE that is NOT research-related . . . . . ___HRS.

D. The hours you spent primarily in ADMINISTRATION that is NOT research-related . . . . . ___HRS.

NOTE: Hours should sum to equal hours in I(A) above.

III. What percent of your time did you spend in all forms of research (as defined in II-A above):

A. in the first year of your first appointment to a faculty __% (Year? 19__)

B. in your fifth year on a faculty _____% Does not Apply [ ]

C. in your tenth year on a faculty _____% Does not Apply [ ]

D. in your fifteenth year on a faculty _____% Does not Apply [ ]

IV. Please enclose a LIST OF YOUR PUBLICATIONS and, if possible, your current Curriculum Vitae. (In addition to providing data necessary for this survey, these personal records will be used to verify the completeness and accuracy of the Association's roster of medical school faculty. This roster is proving to be a valuable source of data for medical schools and for the Association's national effort to support researchers and medical schools.

V. PLEASE SEND THE COMPLETED FORM AND C.V. TO:

Thomas E. Morgan, M.D.
Association of American Medical Colleges
1 Dupont Circle, N.W.
Washington, D.C. 20036

F. Summary of Responses to Research Involvement Questionnaire

Complete statistics summarizing the responses to the research involvement questionnaire for each sampling cell are given in Appendix II.3; the following is a summary of those data. Exhibit II.8 shows the average reported total hours worked per week (Question I), the research hours per week (Question II.A), and the percent of total hours worked spent in research for all faculty responding to the questionnaire. The average work week ranged between 44 and 62 hours per week for different specialties, with a weighted average of 55 hours per week for the total MD faculty. Research activity was broadly defined (Exhibit II.7) to include all research-related teaching , patient care and administration such as time on human subjects review committees. Reported research time averaged from 13 to 34 hours per week, with a weighted average of 19 hours or 35 percent of the total work week for all physicians on the faculty. Not surprisingly, basic scientists spent 62 percent of their time in 1980 in research with the medical specialists spending 39 percent, surgical specialists, 22 percent, hospital-based specialists, 23 percent and behavioral specialists, 30 percent of their work time in research activities.

Changes in the research activities of physician faculty over the span of a career are shown in Exhibit II.9. Percent of time in research activities as a percent of the total hours worked each week is reported for each of the specialty groups by year of award of the MD degree (middle year of such graduation interval). The average age of faculty in each graduation groups is also shown. Basic scientists have the highest reported percent of time in research activities ranging from 55 to 75 percent. The highest percentage of time in research among basic scientists was reported at approximately age 40 (that is, those who graduated from medical school between 1962 and 1967). Medical specialists have the next highest mean percent of time in research. Younger medical specialists

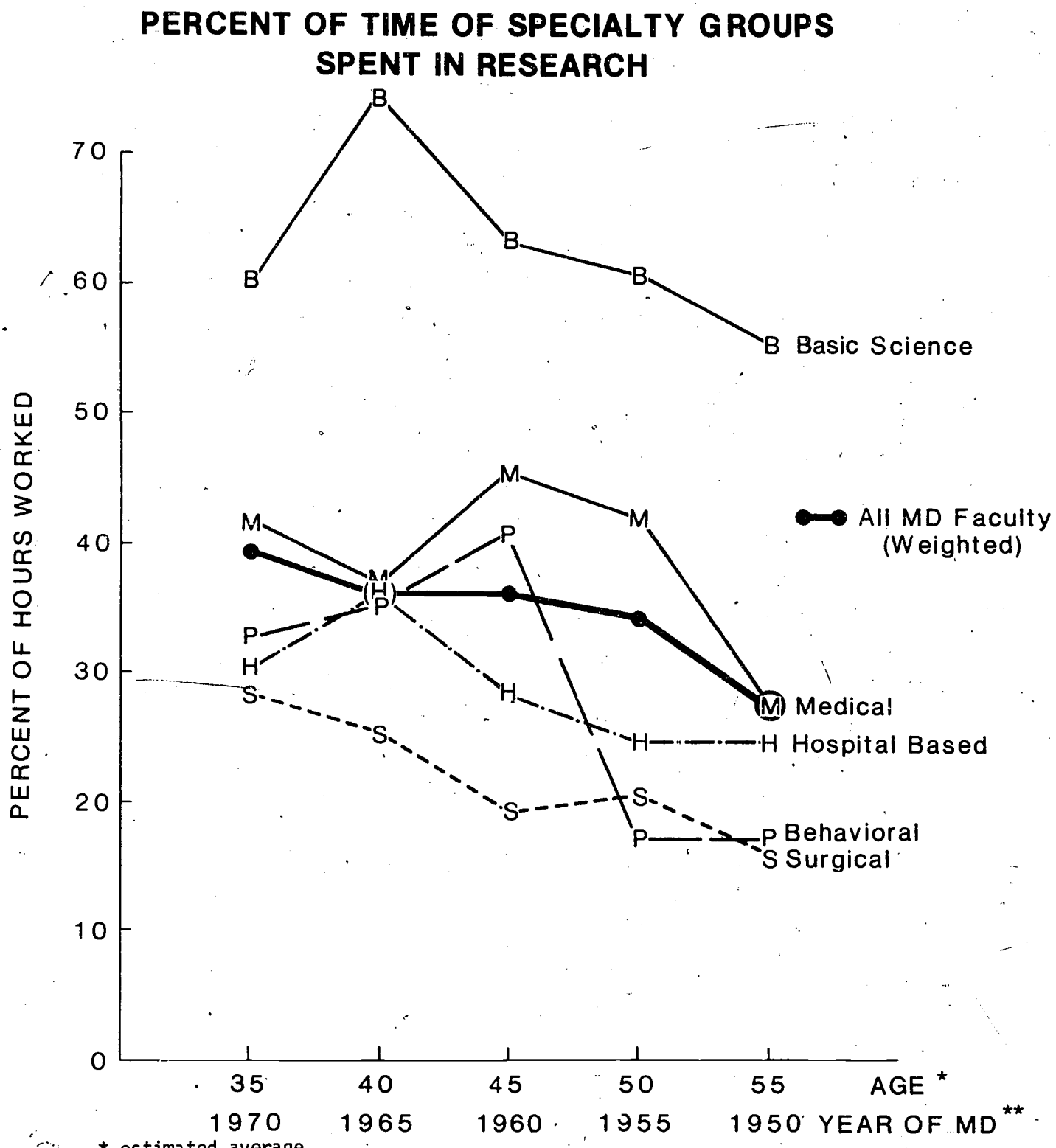
EXHIBIT II.8

AVERAGE REPORTED TOTAL HOURS WORKED PER WEEK

MD FACULTY IN 1980

Specialty Group	Total hours Per week	Research hours Per Week	Percent time In research
Medical	58	23	40%
Surgical	62	13	21%
Behavioral	55	17	31%
Hospital-Based	44	13	30%
Basic Science	55	34	62%
All (weighted to reflect specialty distribution of total MD faculty)	55	19	35%

EXHIBIT II.9



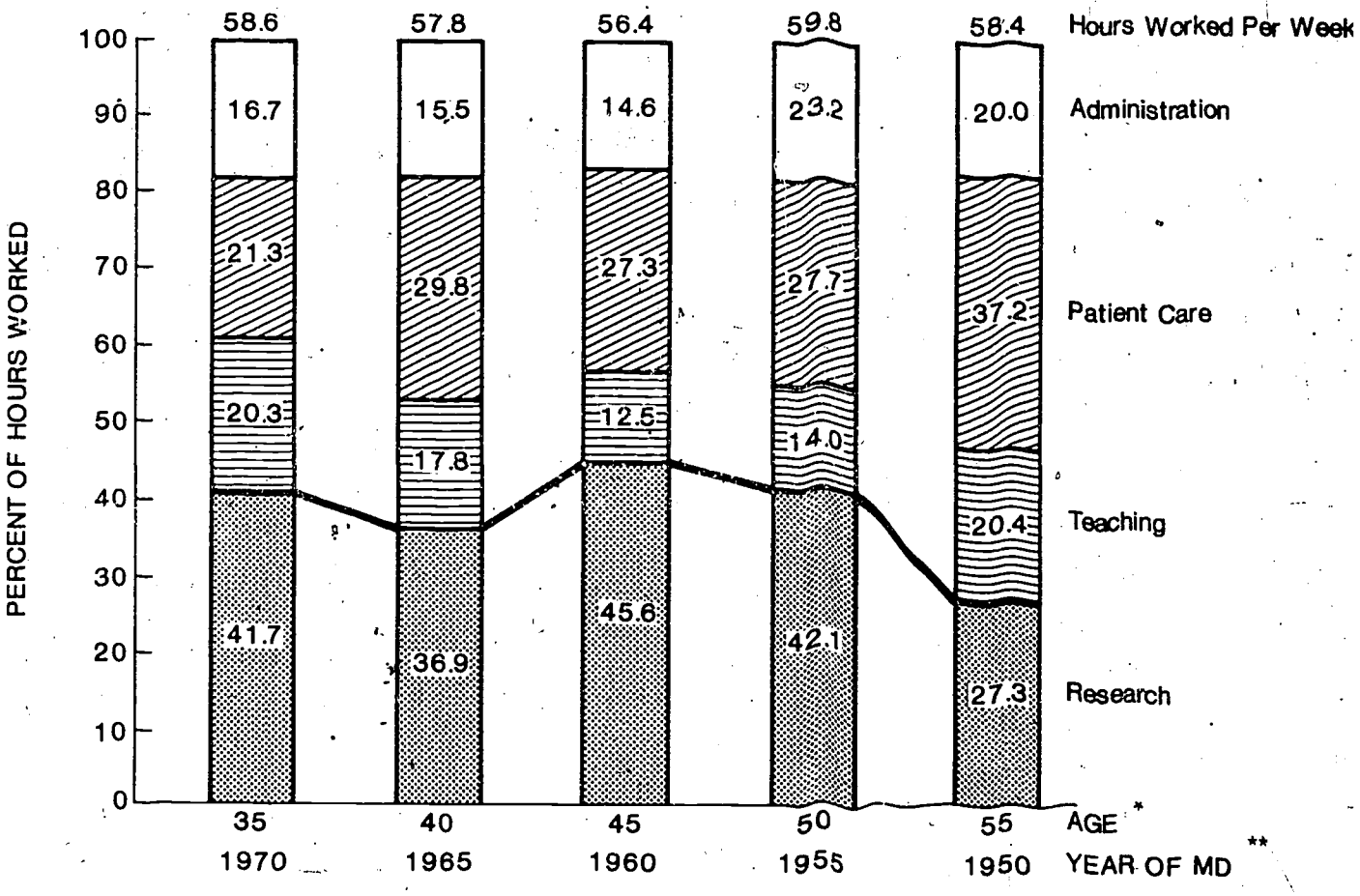
* estimated average
** middle year of sampling interval

averaged 37 to 46 percent of their time in research; this declined to 27 percent for the oldest group of medical specialists (an average age of 55, MD granted around 1950). Surgical specialists in general have the longest work week and the lowest percent of time in research. In all of the specialty groups, including both clinical specialties and basic sciences, the older cohorts spend proportionally less time in research than do younger cohorts. This decrease is most clearly seen in the weighted average percent of time in research reflecting the total MD faculty (heavy line in Exhibit II.9).

Exhibits II.10 through 11.14 show the career activity patterns for the five groups of physicians sampled. In each panel the bar graphs depict (from bottom to top) research, teaching, patient care and administrative hours reported. These are shown as a percentage of the total hours worked each week. At the top of each column is shown the mean hours worked per week reported by the specialists in each group and at the bottom of each column is shown the mean age and the middle year of the MD graduation interval used in the sampling. The bars for percent of time in research activities are connected by a solid line and correspond to the lines shown in Exhibit II.9. Other areas of activity such as teaching and patient care unrelated to research show no clear trends. However, hours spent in administrative duties are clearly greater as a percentage of total work week for older faculty. It may be important to note that for physicians in the basic sciences, the percentage of time in patient care activities is highest for the youngest cohort of faculty, i.e., those who graduated between 1968 and 1972. This pattern also holds for hospital-based specialties. The basic scientists in the 1968-1972 cohort report an average of 15.6 percent of their work week is spent in patient care activities, nearly

EXHIBIT II.10

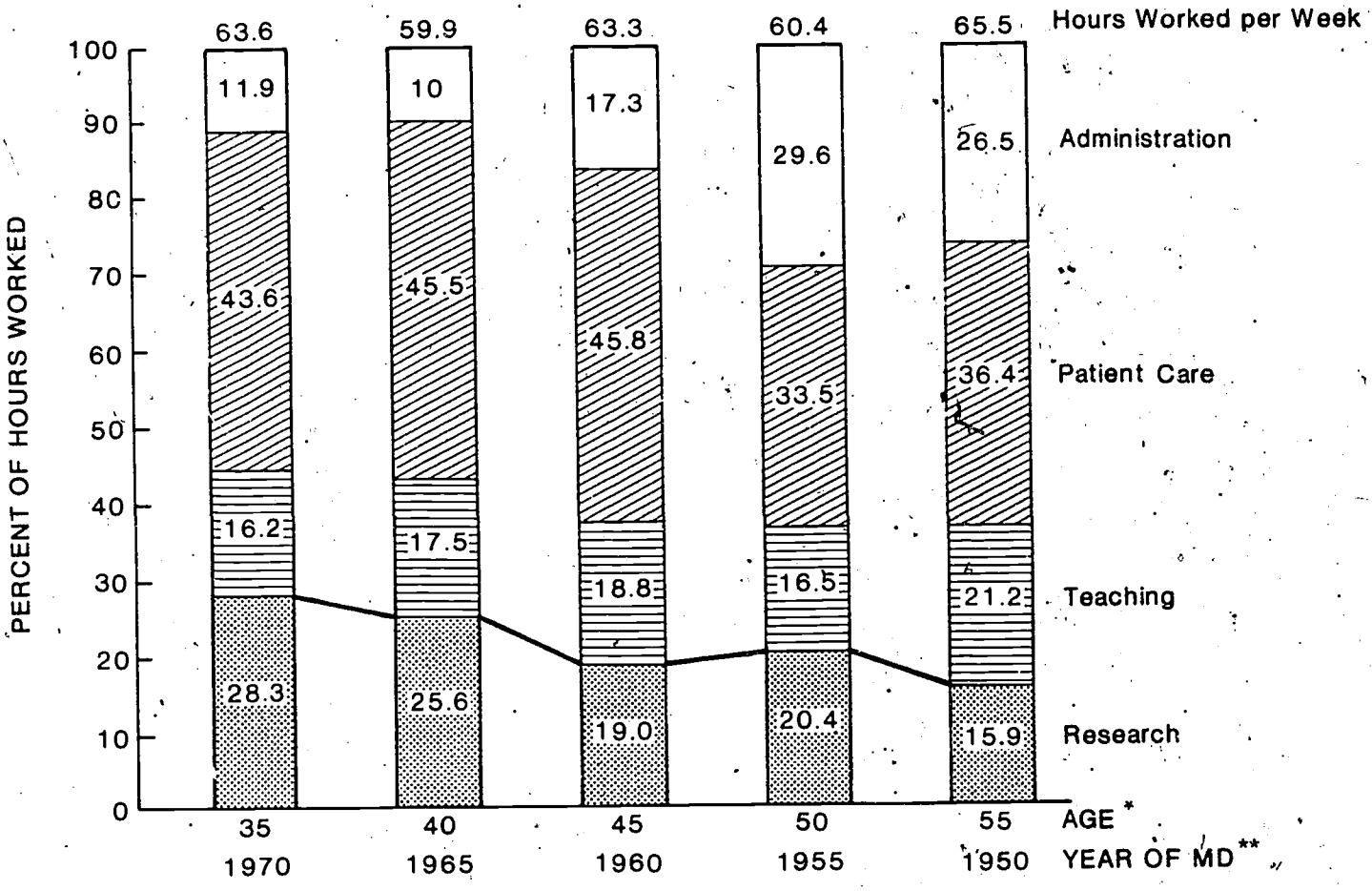
MEDICAL SPECIALISTS



* estimated average
** middle year of sampling interval

EXHIBIT II.11

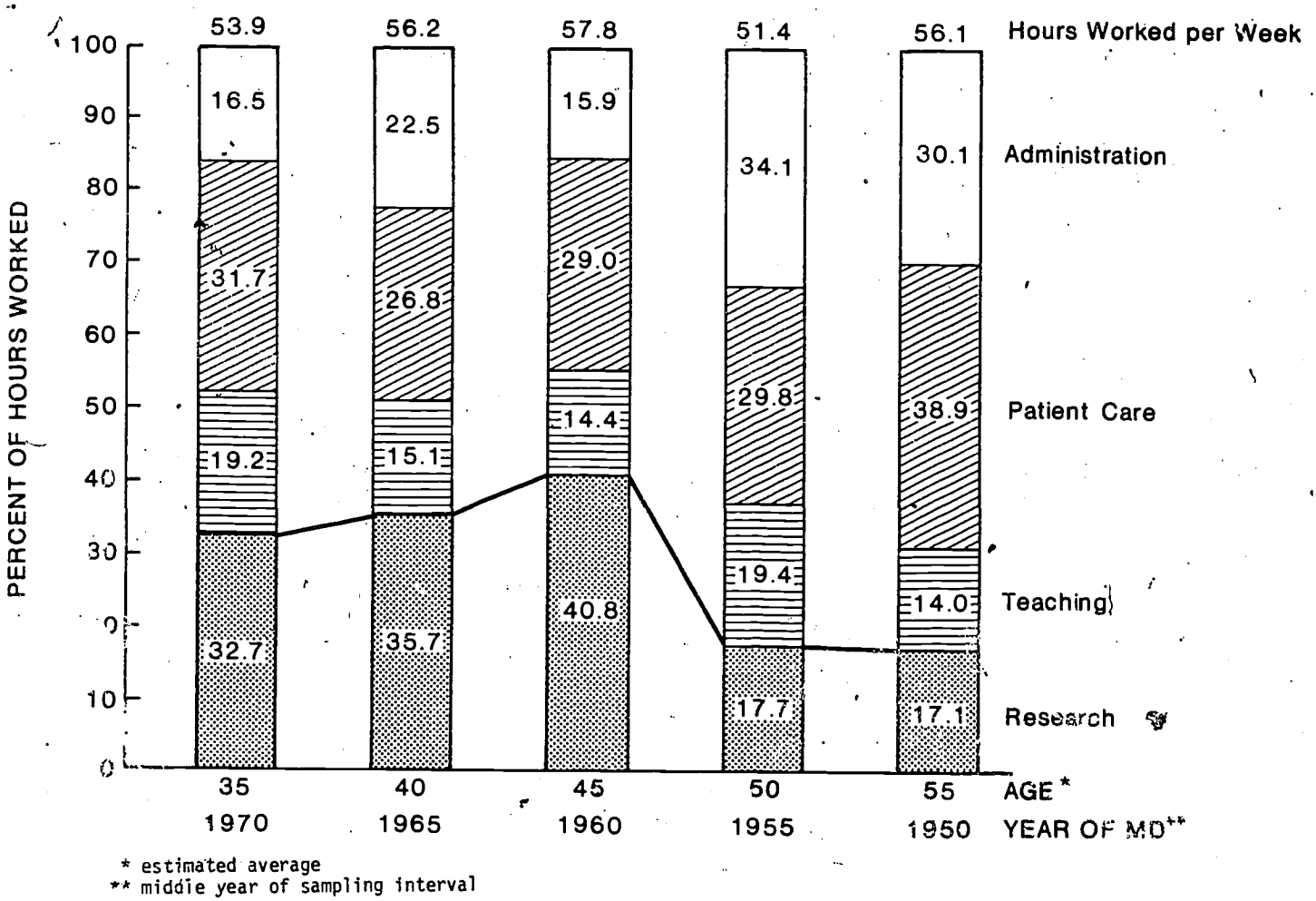
SURGICAL SPECIALISTS



* estimated average
** middle year of sampling interval

EXHIBIT II.12

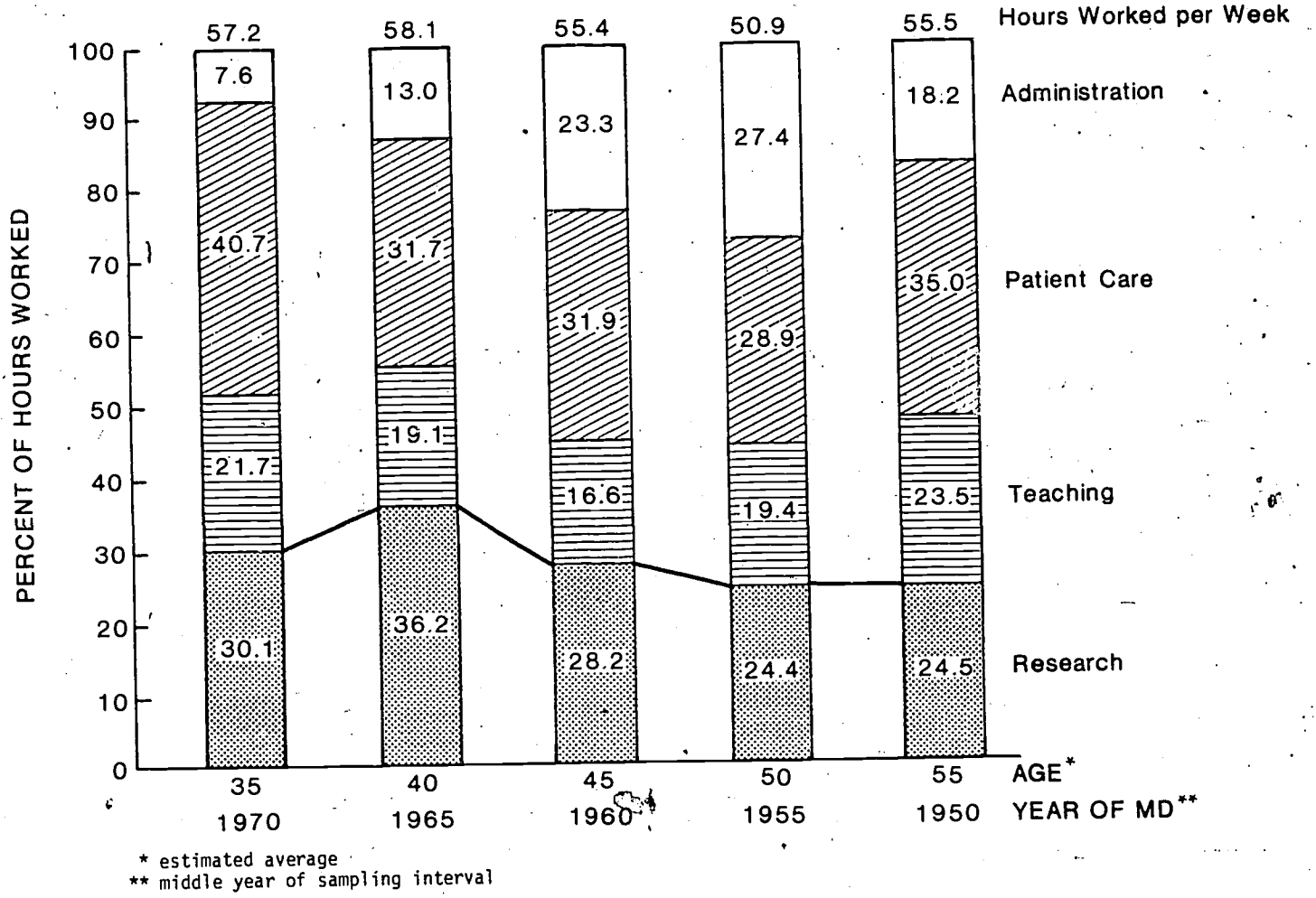
BEHAVIORIAL SPECIALISTS



* estimated average
** middle year of sampling interval

EXHIBIT II.13

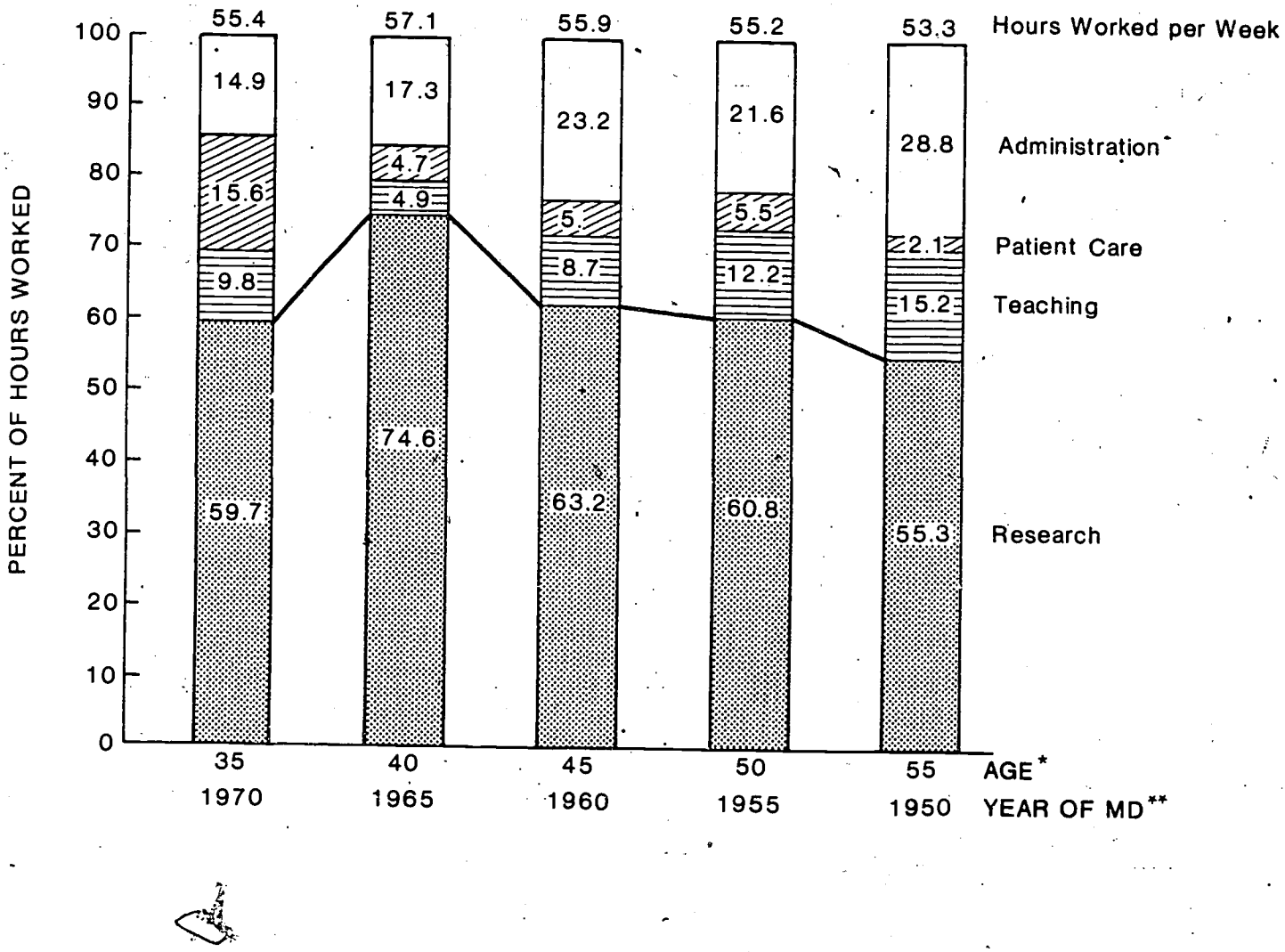
HOSPITAL BASED



* estimated average
** middle year of sampling interval

EXHIBIT II.14

BASIC SCIENTISTS



three times the amount of time in patient care reported by all other groups of basic scientists. Additional analyses would be needed to verify whether this represents a trend that will affect future research productivity.

We were particularly interested in the number of hours physician faculty reported they spent in combined research and teaching or research and patient care activities (Appendix II.3). However, no clear pattern or trend was discernable, although about 5-10 percent of the total research time was spent in each category. In other words, clinical researchers spend 10-20 percent of their total research time simultaneously carrying out research and teaching medical students, residents, and fellows or delivering direct patient care to research patients.

In Exhibit II.9 through II.14 we have shown the trends in physician activities as represented by the reported current activities of selected cohorts. We also developed another way of estimating research activities of these faculty; that is, by obtaining retrospective estimates from each individual of the percent of time spent in research. While such estimates are subject to imprecise memory and judgment, the results (Exhibit II.15) largely conform to the cohort data reported above: the percentages of time spent in research activities vary between specialty groups but decline steadily with advancing age.

G. Analysis of Publication Output

Lists of publications were returned by 546 physicians who responded to the questionnaire. All original articles, books, chapters, and other publications were entered into a computer file for each physician-author. A list of

EXHIBIT II.15

PERCENT TIME SPENT IN RESEARCH

Specialty Group	Year on Faculty			
	1st	5th	10th	15th
Medical	48.1	42.5	28.7	20.8
Surgical	30.8	25.7	12.4	6.5
Behavioral	26.7	35.0	23.9	17.7
Hospital-Based	27.9	31.9	30.8	14.5
Basic Science	64.4	61.5	57.1	46.4

journals in which these articles were published was then prepared and the journals were classified as to the predominant type of articles found in each journal. The classification used was as follows:

Level 1 - General medical publications, with little or no research emphasis (e.g., Hospital Medicine, Resident and Staff Physician, Nations Health).

Level 2 - Publications with significant numbers of research articles together with general medical papers and reviews, (e.g., New England Journal of Medicine).

Level 3 - Journals containing clinical research articles only or predominantly original research articles (e.g., Journal of Clinical Investigation).

Level 4 - Journals containing original basic research articles or reviews only (e.g., Journal of Physiology, Journal of Cell Biology).

For purposes of analysis it was decided to report the number of all publications (articles, books, chapters, etc.) per author per year ("All publications"). We also reported the number of publications in a special set of research journals per author per year. It was assumed that, for physician scientists, publication in a Level 3 or Level 4 journal, regardless of the quality or degree of peer review of submitted manuscripts, would be allowed as prima facie evidence of research activity. In addition, we recognized that a limited number of Level 2 journals have rigorous editorial and peer review policies. In 1979 the National Institutes of Health surveyed laboratory chiefs, study section secretaries and other knowledgeable persons and compiled a list of 293 journals which were the outstanding research journals in the many fields of research supported by NIH. We reviewed this list and found that it generally met our criteria for "research" journals. In the time

between the formulation of the NIH list of journals and the conduct of our survey a significant number of new research journals appeared, therefore we updated the NIH list by deleting all Level 1 publications and adding all Level 3 (clinical research only) and Level 4 (basic research) journals which had begun publication since 1971. This gave us a list of 490 "select research" journals as a special set in which a published manuscript could be presumed to have met original research criteria. (Appendix II.4) The rate of "select research publications" and of "all publications" was computed in terms of publications per author per year for each of the five specialty groups and for each of the five graduation eras. Plotting these rates of publication for each cell in the sampling frame produced the publication profiles shown in Exhibits II.16 through II.40. Curves were smoothed by averaging the rate for a given year with the rates for the preceding and following years. The tables accompanying each profile show both raw publication rates and smoothed rates for all authors in each sample cell.

Inspection of these profiles reveals a number of interesting results: First, there were clear differences between the clinical specialty groups. Medical specialists in all but the oldest cohort reached a plateau at about twelve years after graduation with a gradual decline thereafter. Surgeons reached a higher rate of publication in all and in "select" research journals which declined sharply after about age 45 (career age 20). Behavioral specialists had much lower publication rates, averaging about 0.2 publications per year in "select" research journals. Behavioral specialists graduating after 1963, however, had "select" research publication rates approaching one per year. The output profile of hospital-based physicians resembeld that of the surgical specialists. Second, the data suggest that basic scientists, like some other academicians previously studied,* show a mid-career decline and then a late

*Lehman, Harvey C. Age and Achievement. Princeton, N.J.: Princeton University Press. 1953

AAMC MEDICAL FACULTY

RESEARCH PRODUCTIVITY STUDY

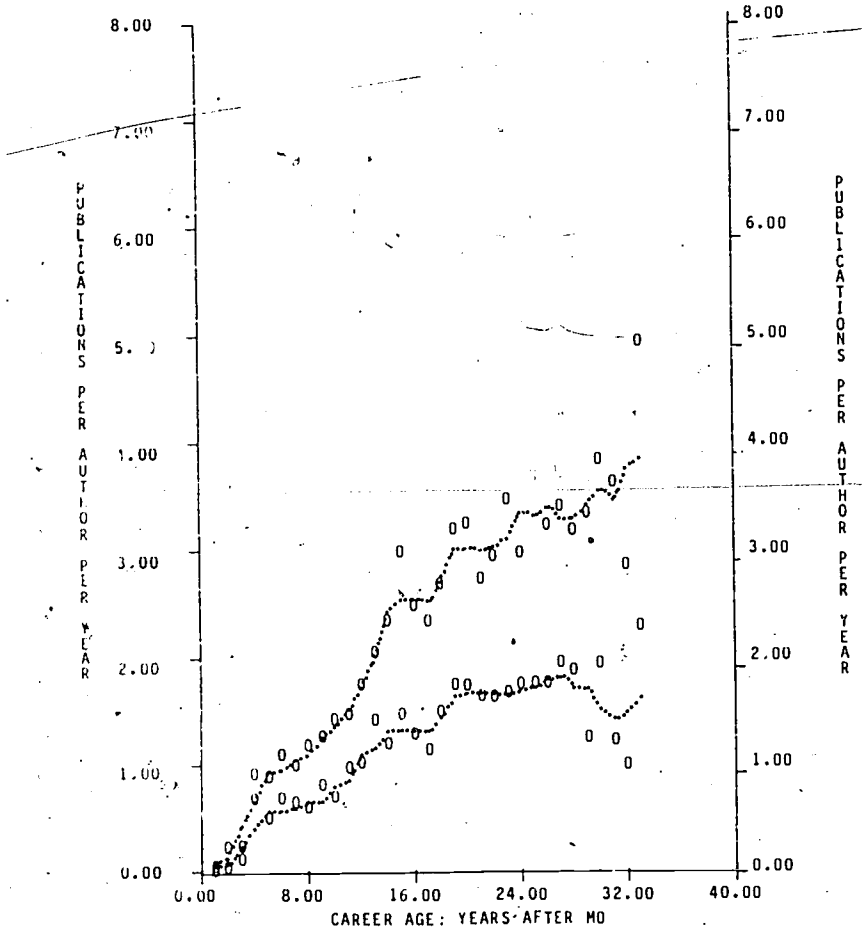
MEDICAL SPECIALTIES

EXHIBITS II.16 TO II.20

CHRONOLOGICAL AGE IS APPROXIMATELY CAREER AGE PLUS 25 YEARS

Exhibit II.16

MEDICAL SPECIALTIES, GRADS FROM 1944-52



CAREER AGE	NUMBER AUTH	PUBL RATE RAW	PUBL RATE SMOOTH	SPCL RATE RAW	SPCL RATE SMOOTH
1	20	.05	.15	.00	.02
2	20	.25	.18	.05	.07
3	20	.25	.48	.15	.30
4	20	.95	.70	.70	.45
5	20	.90	1.00	.50	.63
6	20	1.15	1.02	.70	.62
7	20	1.00	1.12	.65	.65
8	20	1.20	1.17	.60	.70
9	20	1.30	1.32	.85	.72
10	20	1.45	1.42	.70	.85
11	20	1.50	1.58	1.00	.92
12	20	1.80	1.80	1.05	1.17
13	20	2.10	2.10	1.45	1.23
14	20	2.40	2.52	1.20	1.38
15	20	3.05	2.65	1.50	1.33
16	20	2.50	2.63	1.30	1.32
17	20	2.35	2.53	1.15	1.33
18	20	2.75	2.78	1.55	1.50
19	20	3.25	3.10	1.80	1.70
20	20	3.30	3.10	1.75	1.73
21	20	2.75	3.02	1.65	1.68
22	20	3.00	3.10	1.65	1.67
23	20	3.55	3.18	1.70	1.72
24	20	3.00	3.43	1.80	1.77
25	20	3.75	3.33	1.80	1.80
26	20	3.25	3.48	1.80	1.87
27	20	3.45	3.30	2.00	1.90
28	20	3.20	3.35	1.90	1.72
29	20	3.40	3.50	1.25	1.72
30	18	3.89	3.65	2.00	1.50
31	17	3.65	3.47	1.24	1.41
32	16	2.88	3.84	1.00	1.53
33	11	5.00	3.94	2.36	1.68
34	9				
35	6				
36	5				
37	4				

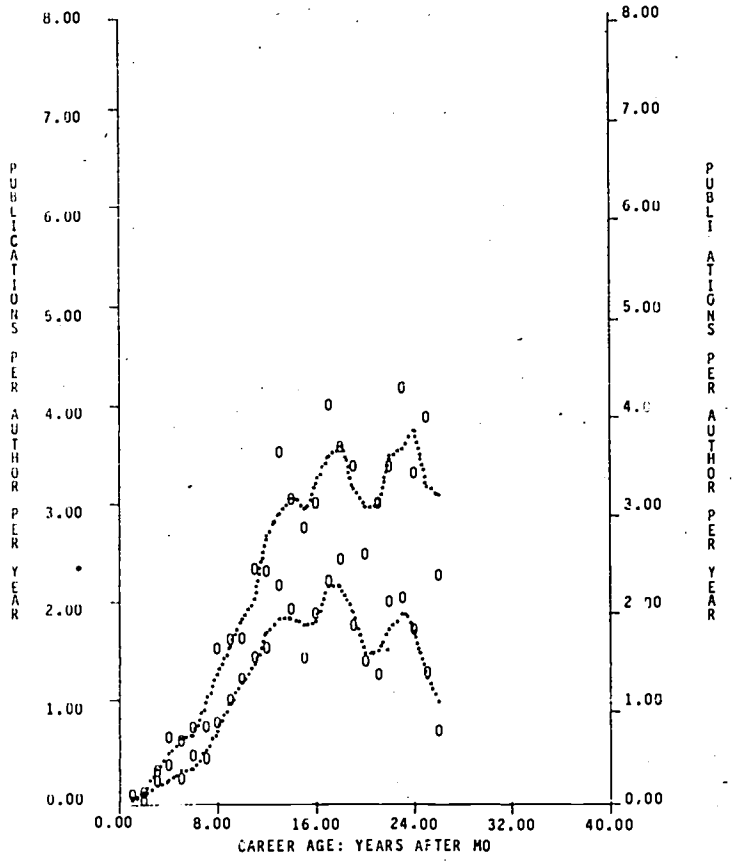
KEY

Upper line: all articles, books, etc.
Lower line: articles in special journal subset

Curves smoothed by running average of three.
Only averages of 10 or more authors are used.

MEDICAL SPECIALTIES, GRADS FROM 1953-57

Exhibit II.17



CAREER AGE	NUMBER AUTH	PUBL RATE RAW	PUBL RATE SMOOTH	SPCL RATE RAW	SPCL RATE SMOOTH
1	18	.06	.08	.06	.03
2	18	.11	.17	.00	.09
3	18	.33	.37	.22	.20
4	18	.67	.54	.39	.[illegible]
5	18	.61	.69	.22	.37
6	18	.78	.72	.50	.39
7	18	.[illegible]	1.[illegible]	.44	.59
8	18	1.61	1.35	.83	.78
9	18	1.67	1.65	1.05	1.06
10	18	1.67	1.91	1.20	1.28
11	18	2.39	2.13	1.50	1.46
12	18	2.33	2.[illegible]8	1.61	1.78
13	18	3.61	3.00	2.22	1.93
14	18	3.06	3.15	1.94	1.87
15	18	2.78	2.96	1.44	1.76
16	18	3.06	3.30	1.94	1.89
17	18	4.06	3.57	2.28	2.24
18	18	3.61	3.69	2.50	2.19
19	18	3.39	3.17	1.78	1.89
20	18	2.50	2.98	1.39	1.48
21	18	3.06	3.00	1.28	1.57
22	18	3.44	3.57	2.06	1.81
23	18	4.22	3.67	2.11	1.96
24	18	3.33	3.83	1.72	1.71
25	14	3.93	3.19	1.29	1.24
26	10	2.30	3.11	.70	.99
27	4				
28	2				

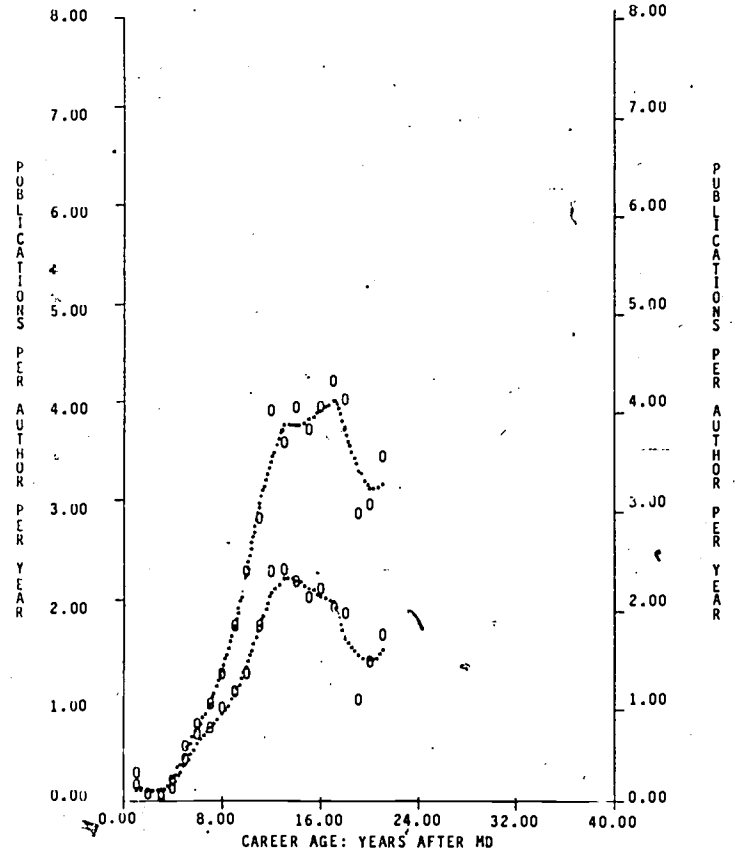
KEY

Upper line: all articles, books, etc.
Lower line: articles in special journal subset

Curves smoothed by running average of three.
Only averages of 10 or more authors are used.

MEDICAL SPECIALTIES, GRADS FROM 1958-62

Exhibit II.18



CAREER AGE	NUMBER AUTH	PUBL RATE RAW	PUBL RATE SMOOTH	SPCL RATE RAW	SPCL RATE SMOOTH
1	25	.24	.14	.12	.08
2	25	.04	.11	.04	.05
3	25	.04	.09	.00	.05
4	25	.20	.27	.12	.19
5	25	.56	.52	.44	.41
6	25	.80	.79	.68	.63
7	25	1.00	1.04	.76	.80
8	25	1.32	1.37	.96	.95
9	25	1.80	1.83	1.12	1.13
10	25	2.[illegible]6	2.35	1.32	1.41
11	25	2.88	3.07	1.80	1.83
12	25	3.96	3.48	2.36	2.17
13	25	3.60	3.85	2.36	2.31
14	25	4.00	3.77	2.20	2.20
15	25	3.72	3.91	2.04	2.13
16	25	4.00	4.00	2.16	2.04
17	25	4.28	4.11	1.92	1.99
18	25	4.04	3.73	1.68	1.60
19	25	2.88	3.31	1.00	1.44
20	18	3.00	3.13	1.44	1.39
21	14	3.[illegible]9	3.25	1.71	1.58
22	9				
23	3				

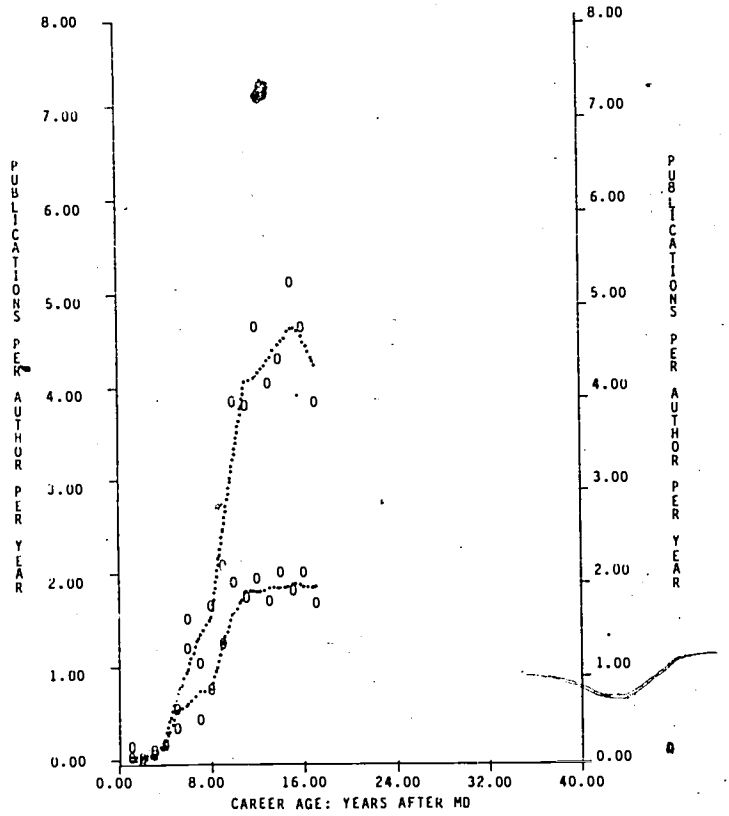
KEY

Upper line: all articles, books, etc.
Lower line: articles in special journal subset

Curves smoothed by running average of three.
Only averages of 10 or more authors are used.

Exhibit II.19

MEDICAL SPECIALTIES. GRADS FROM 1963-67



CAREER AGE	NUMBER AUTH	PUBL RATE RAW	PUBL RATE SMOOTH	SPCL RATE RAW	SPCL RATE SMOOTH
1	28	.14	.09	.04	.02
2	28	.04	.11	.00	.05
3	28	.14	.13	.11	.11
4	28	.21	.32	.21	.24
5	28	.61	.80	.39	.62
6	28	1.57	1.07	1.25	.69
7	28	1.04	1.43	.43	.83
8	28	1.68	1.62	.82	.85
9	28	2.14	2.57	1.29	1.36
10	28	3.89	3.29	1.96	1.67
11	28	3.82	4.14	1.75	1.90
12	28	4.71	4.20	2.00	1.82
13	28	4.07	4.38	1.71	1.93
14	28	4.36	4.54	2.07	1.87
15	22	5.18	4.74	1.82	1.98
16	18	4.67	4.56	2.06	1.86
17	13	3.85	4.26	1.69	1.87
18	8				

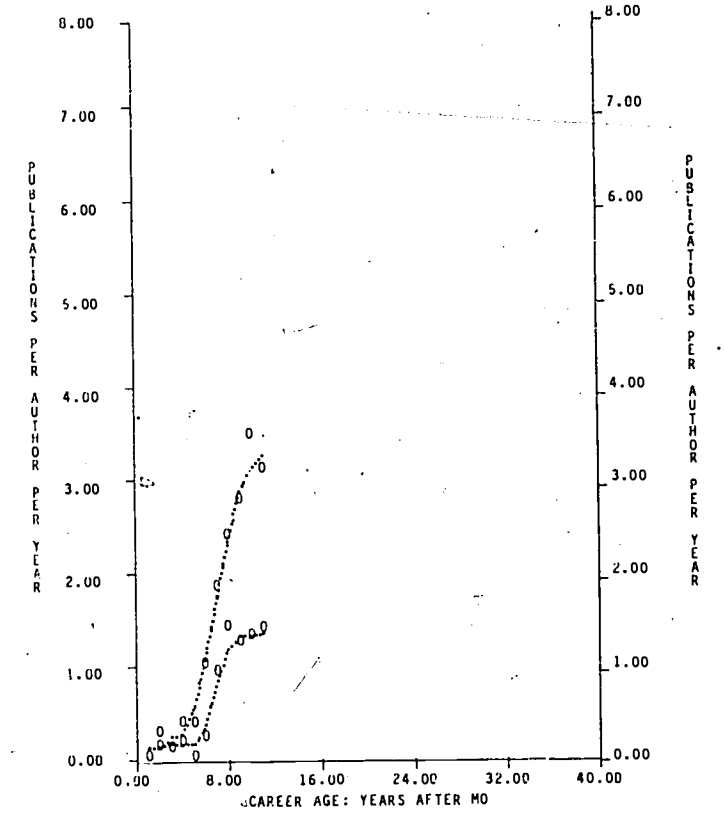
KEY

Upper line: all articles, books, etc.
Lower line: articles in special journal subset

Curves smoothed by running average of three.
Only averages of 10 or more authors are used.

Exhibit II.20

MEDICAL SPECIALTIES, GRADS FROM 1967-72



CAREER AGE	NUMBER AUTH	PUBL RATE RAW	PUBL RATE SMOOTH	SPCL RATE RAW	SPCL RATE SMOOTH
1	27	.04	.19	.04	.11
2	27	.33	.17	.19	.12
3	27	.15	.31	.15	.19
4	27	.44	.33	.22	.14
5	27	.41	.64	.04	.19
6	27	1.07	1.14	.30	.44
7	27	1.93	1.83	1.00	.93
8	27	2.48	2.42	1.48	1.26
9	27	2.85	2.97	1.30	1.39
10	21	3.57	3.19	1.38	1.38
11	13	3.15	3.36	1.46	1.42
12	4				
13	1				

KEY

Upper line: all articles, books, etc.
Lower line: articles in special journal subset

Curves smoothed by running average of three.
Only averages of 10 or more authors are used.

AAMC MEDICAL FACULTY

RESEARCH PRODUCTIVITY STUDY

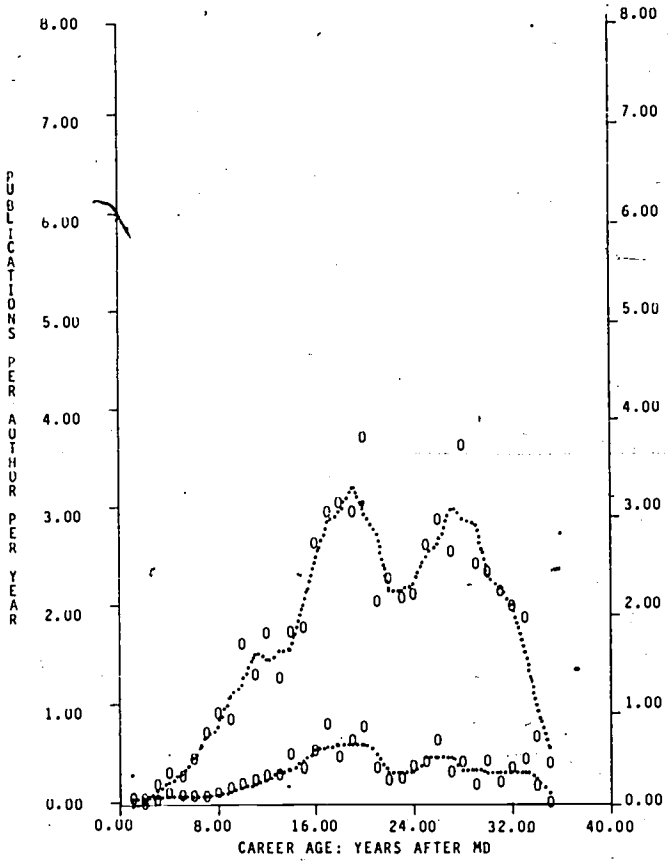
SURGICAL SPECIALTIES

EXHIBITS II.21 TO II.25

CHRONOLOGICAL AGE IS APPROXIMATELY CAREER AGE PLUS 25 YEARS

SURGICAL SPECIALTIES, GRADS FROM 1944-52

Exhibit II.21



CAREER AGE	NUMBER AUTH	PUBL RATE RAW	PUBL RATE SMOOTH	SPCL RATE RAW	SPCL RATE SMOOTH
1	22	.05	.05	.05	.02
2	22	.05	.11	.00	.05
3	22	.23	.21	.09	.08
4	22	.36	.29	.14	.11
5	22	.27	.38	.09	.11
6	22	.50	.52	.09	.09
7	22	.77	.74	.09	.11
8	22	.95	.86	.14	.14
9	22	.86	1.15	.18	.18
10	22	1.64	1.27	.23	.23
11	22	1.32	1.58	.27	.27
12	22	1.77	1.45	.32	.30
13	22	1.27	1.61	.32	.39
14	22	1.77	1.62	.55	.41
15	22	1.92	2.09	.36	.50
16	22	2.68	2.50	.59	.61
17	22	3.00	2.92	.86	.64
18	22	3.09	3.02	.45	.67
19	22	2.95	3.27	.68	.65
20	22	3.77	2.92	.82	.62
21	22	2.05	2.71	.36	.47
22	22	2.32	2.15	.23	.29
23	22	2.09	2.18	.27	.30
24	22	2.14	2.29	.41	.38
25	22	2.64	2.56	.45	.52
26	22	2.91	2.70	.68	.48
27	22	2.55	3.05	.32	.48
28	22	3.68	2.88	.45	.32
29	22	2.41	2.81	.18	.37
30	21	2.33	2.30	.48	.29
31	20	2.15	2.16	.20	.36
32	18	2.00	2.01	.39	.36
33	16	1.88	1.51	.50	.35
34	12	.67	.98	.17	.22
35	10	.40	.53	.00	.08
36	7				
37	5				

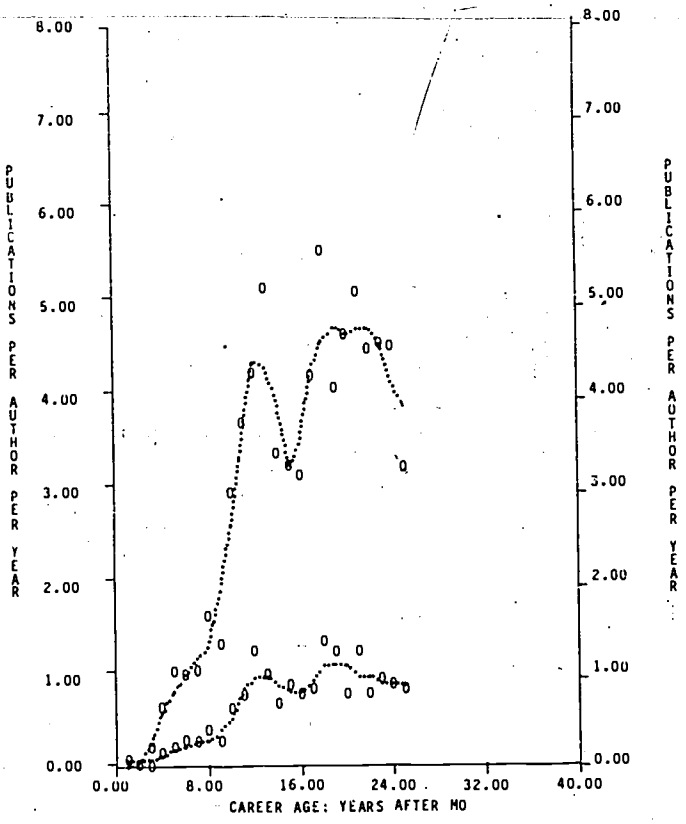
KEY

Upper line: all articles, books, etc.
Lower line: articles in special journal subset

Curves smoothed by running average of three.
Only averages of 10 or more authors are used.

SURGICAL SPECIALTIES, GRADS FROM 1953-57

Exhibit II.22



CAREER AGE	NUMBER AUTH	PUBL RATE RAW	PUBL RATE SMOOTH	SPCL RATE RAW	SPCL RATE SMOOTH
1	20	.05	.02	.05	.02
2	20	.00	.08	.00	.02
3	20	.20	.28	.00	.05
4	20	.65	.63	.15	.12
5	20	1.05	.88	.20	.22
6	20	.95	1.02	.30	.25
7	20	1.05	1.22	.25	.32
8	20	1.65	1.33	.40	.30
9	20	1.30	1.97	.25	.43
10	20	2.95	2.65	.65	.57
11	20	3.70	3.63	.80	.90
12	20	4.25	4.37	1.25	1.00
13	20	5.15	4.25	.95	.95
14	20	3.35	3.90	.65	.83
15	20	3.20	3.22	.90	.77
16	20	3.10	3.50	.75	.83
17	20	4.20	4.28	.85	.98
18	20	5.55	4.60	1.35	1.13
19	20	4.05	4.75	1.20	1.10
20	20	4.65	4.60	.75	1.07
21	20	5.10	4.73	1.25	.92
22	20	4.45	4.70	.75	.98
23	20	4.55	4.50	.95	.85
24	20	4.50	4.08	.85	.87
25	11	3.18	3.84	.82	.83
26	9	.00	.00	.00	.00
27	7				
28	3				

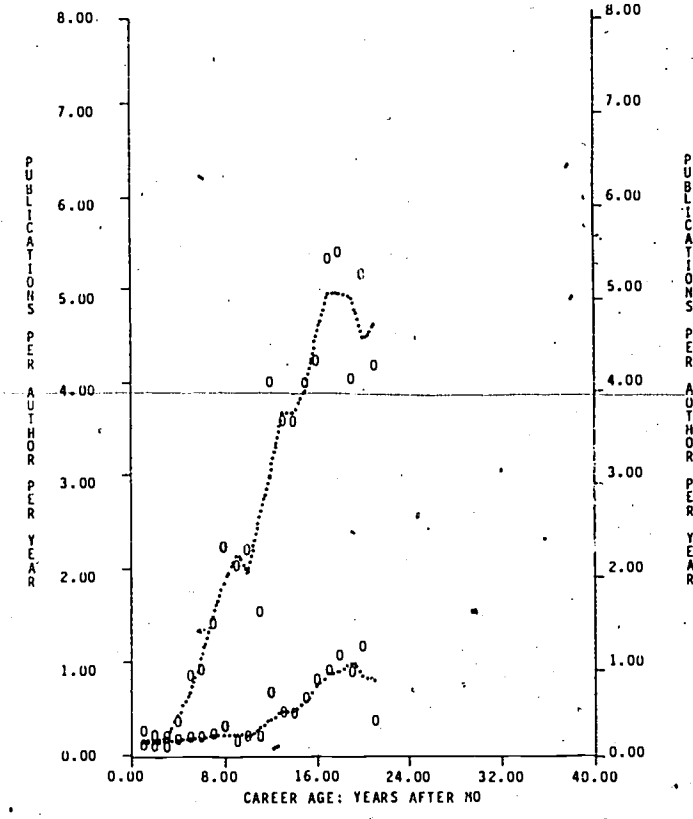
KEY

Upper line: all articles, books, etc.
Lower line: articles in special journal subset

Curves smoothed by running average of three.
Only averages of 10 or more authors are used.

SURGICAL SPECIALTIES, GRADS FROM 1958-62

Exhibit II.23



CAREER AGE	NUMBER AUTH	PUBL RATE RAW	PUBL RATE SMOOTH	SPCL RATE RAW	SPCL RATE SMOOTH
1	20	.25	.22	.10	.10
2	20	.20	.22	.10	.10
3	20	.20	.27	.10	.13
4	20	.40	.50	.20	.17
5	20	.90	.75	.20	.20
6	20	.95	1.10	.20	.22
7	20	1.45	1.57	.25	.27
8	20	2.30	1.93	.35	.25
9	20	2.05	2.20	.15	.25
10	20	2.25	1.95	.25	.20
11	20	1.55	2.62	.20	.38
12	20	4.05	3.07	.70	.45
13	20	3.60	3.75	.45	.53
14	20	3.60	3.75	.45	.52
15	20	4.05	3.98	.65	.65
16	20	4.30	4.58	.85	.82
17	20	5.40	5.05	.95	.97
18	20	5.45	4.97	1.10	.98
19	20	4.05	4.90	.90	1.07
20	14	5.21	4.48	1.21	.83
21	11	4.18	4.70	.36	.79
22	6				
23	3				

KEY

Upper line: all articles, books, etc.
Lower line: articles in special journal subset

Curves smoothed by running average of three.
Only averages of 10 or more authors are used.

SURGICAL SPECIALTIES, GRADS FROM 1963-67

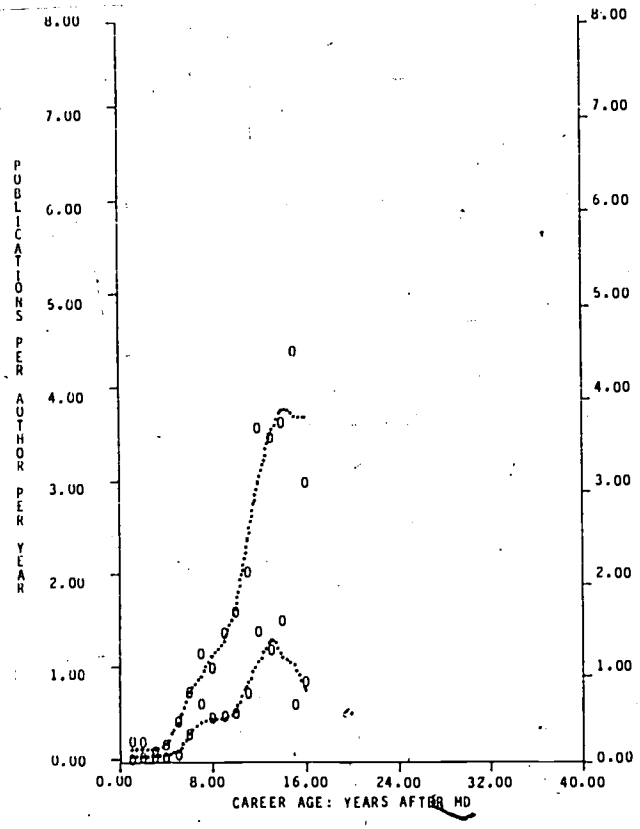


Exhibit II.24

CAREER AGE	NUMBER AUTH	PUBL RATE RAW	PUBL RATE SMOOTH	SPCL RATE RAW	SPCL RATE SMOOTH
1	22	.18	.18	.00	.02
2	22	.18	.15	.05	.03
3	22	.09	.15	.05	.05
4	22	.18	.24	.05	.06
5	22	.45	.47	.09	.15
6	22	.77	.80	.32	.35
7	22	1.18	.98	.64	.47
8	22	1.00	1.20	.45	.53
9	22	1.41	1.35	.50	.50
10	22	1.64	1.71	.55	.61
11	22	2.09	2.45	.77	.91
12	22	3.64	3.08	1.41	1.12
13	22	3.50	3.61	1.18	1.38
14	22	3.68	3.88	1.55	1.11
15	15	4.47	3.72	.60	1.02
16	10	3.00	3.73	.90	.75
17	4				
18	2				

KEY

Upper line: all articles, books, etc.
Lower line: articles in special journal subset

Curves smoothed by running average of three.
Only averages of 10 or more authors are used.

SURGICAL SPECIALTIES, GRADS FROM 1967-72

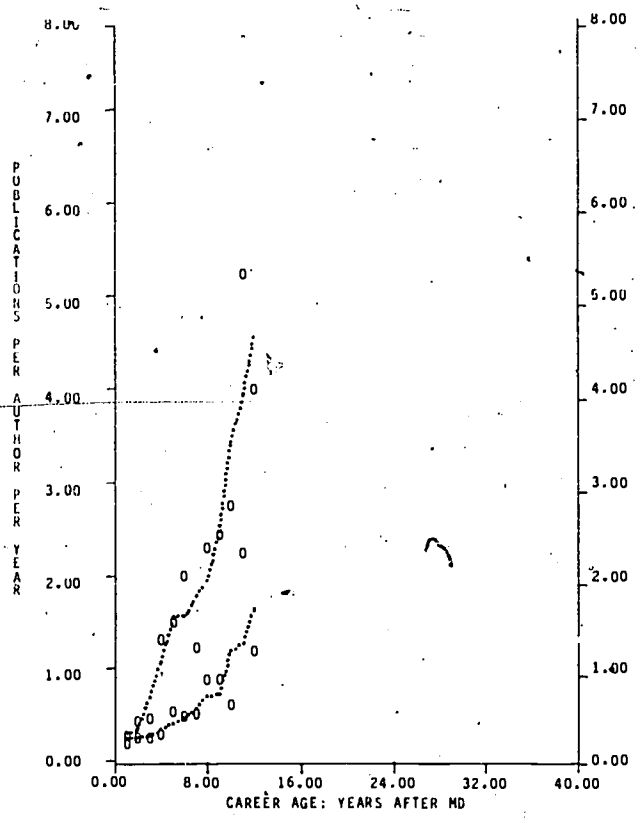


Exhibit II.25

CAREER AGE	NUMBER AUTH	PUBL RATE RAW	PUBL RATE SMOOTH	SPCL RATE RAW	SPCL RATE SMOOTH
1	22	.27	.36	.18	.23
2	22	.45	.41	.27	.24
3	22	.50	.77	.27	.29
4	22	1.36	1.14	.32	.39
5	22	1.55	1.65	.59	.47
6	22	2.05	1.61	.50	.55
7	22	1.23	1.88	.55	.65
8	22	2.36	2.03	.91	.79
9	22	2.50	2.56	.5	.81
10	16	2.81	3.53	.63	1.27
11	14	5.29	4.03	2.29	1.36
12	11	4.00	4.64	1.18	1.73
13	6				

KEY

Upper line: all articles, books, etc.
Lower line: articles in special journal subset

Curves smoothed by running average of three.
Only averages of 10 or more authors are used.

AAMC MEDICAL FACULTY

RESEARCH PRODUCTIVITY STUDY

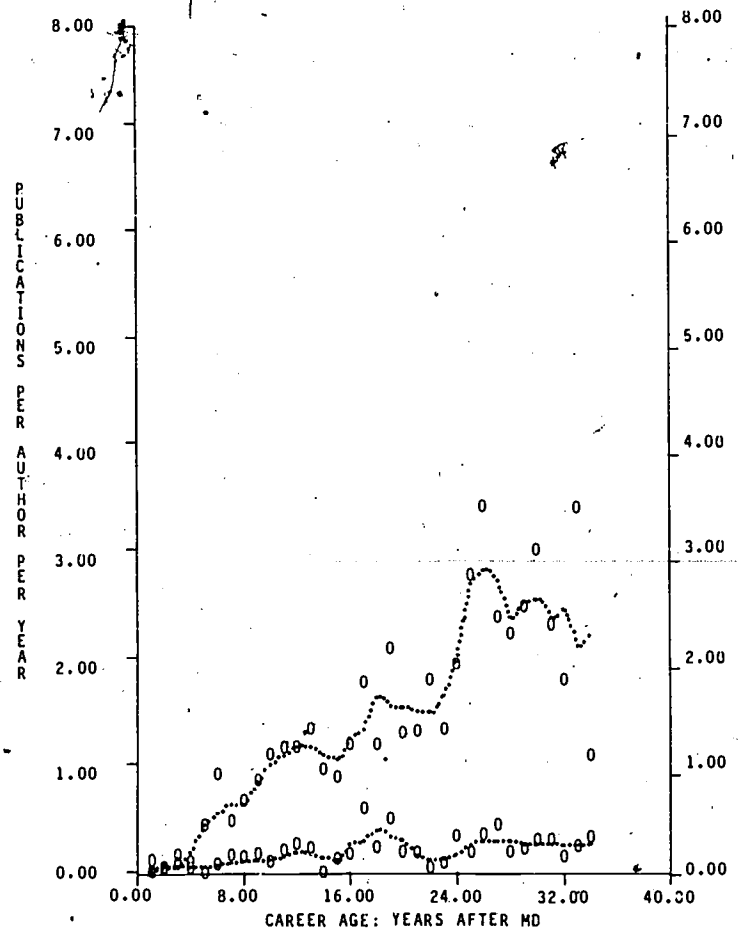
BEHAVIORAL SPECIALTIES

EXHIBITS II.26 TO II.30

CHRONOLOGICAL AGE IS APPROXIMATELY CAREER AGE PLUS 25 YEARS

BEHAVIORAL SPECIALTIES, GRADS FROM 1944-52

Exhibit II.26



CAREER AGE	NUMBER AUTH	PUBL RATE RAW	PUBL RATE SMOOTH	SPCL RATE RAW	SPCL RATE SMOOTH
1	21	.10	.07	.00	.02
2	21	.05	.11	.05	.05
3	21	.19	.11	.10	.06
4	21	.10	.25	.05	.05
5	21	.48	.51	.00	.05
6	21	.95	.63	.10	.10
7	21	.48	.71	.19	.14
8	21	.71	.70	.14	.17
9	21	.90	.92	.19	.14
10	21	1.14	1.08	.10	.17
11	21	1.19	1.17	.24	.21
12	21	1.19	1.25	.29	.25
13	21	1.38	1.17	.24	.17
14	21	.95	1.08	.00	.13
15	21	.90	1.03	.14	.11
16	21	1.24	1.32	.19	.32
17	21	1.81	1.41	.62	.35
18	21	1.19	1.71	.24	.46
19	21	2.14	1.54	.52	.32
20	21	1.29	1.59	.19	.30
21	21	1.33	1.49	.19	.14
22	21	1.86	1.51	.05	.11
23	21	1.33	1.75	.10	.17
24	21	2.00	2.05	.38	.22
25	21	2.81	2.76	.19	.32
26	21	3.48	2.89	.38	.35
27	21	2.38	2.70	.48	.35
28	21	2.24	2.38	.19	.30
29	21	2.52	2.61	.24	.25
30	18	3.06	2.63	.33	.29
31	16	2.31	2.38	.31	.26
32	14	1.79	2.52	.14	.24
33	11	3.45	2.11	.27	.26
34	11	1.09	2.27	.36	.32
35	9				
36	1				

KEY

Upper line: all articles, books, etc.
Lower line: articles in special journal subset

Curves smoothed by running average of three.
Only averages of 10 or more authors are used.

BEHAVIORAL SPECIALTIES, GRADS FROM 1953-57

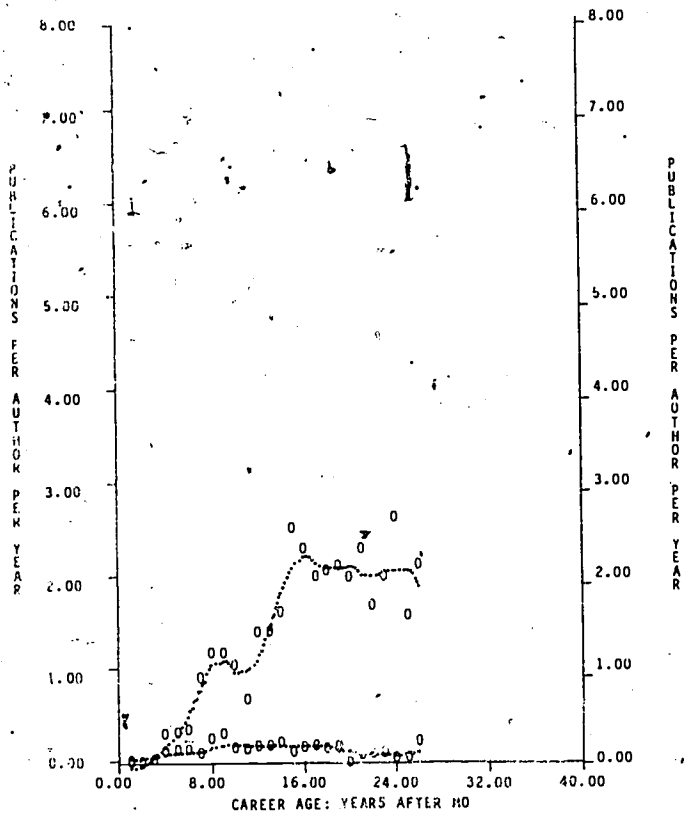


Exhibit II.27

CAREER AGE	NUMBER AUTH	PUBL RATE RAW	PUBL RATE SMOOTH	SPCL RATE RAW	SPCL RATE SMOOTH
1	21	.00	.00	.00	.00
2	21	.00	.02	.00	.02
3	21	.05	.13	.05	.06
4	2.	.33	.24	.14	.11
5	21	.33	.35	.14	.14
6	21	.38	.56	.14	.13
7	21	.95	.86	.10	.17
8	21	1.24	1.13	.29	.24
9	21	1.19	1.16	.33	.25
10	21	1.05	.97	.14	.21
11	21	.67	1.05	.14	.16
12	21	1.43	1.17	.19	.17
13	21	1.43	1.51	.19	.21
14	21	1.67	1.89	.24	.17
15	21	2.57	2.17	.10	.17
16	21	2.29	2.29	.19	.16
17	21	2.00	2.13	.19	.17
18	21	2.10	2.08	.14	.17
19	21	2.14	2.08	.19	.11
20	21	2.00	2.16	.00	.10
21	21	2.33	2.00	.10	.06
22	21	1.67	2.02	.10	.10
23	21	2.05	2.13	.10	.08
24	21	2.67	2.10	.05	.07
25	14	1.57	2.13	.07	.12
26	12	2.17	1.87	.25	.16
27	6				
28	1				

KEY

Upper line: all articles, books, etc.
Lower line: articles in special journal subset

Curves smoothed by running average of three.
Only averages of 10 or more authors are used.

BEHAVIORAL SPECIALTIES, GRADS FROM 1958-62

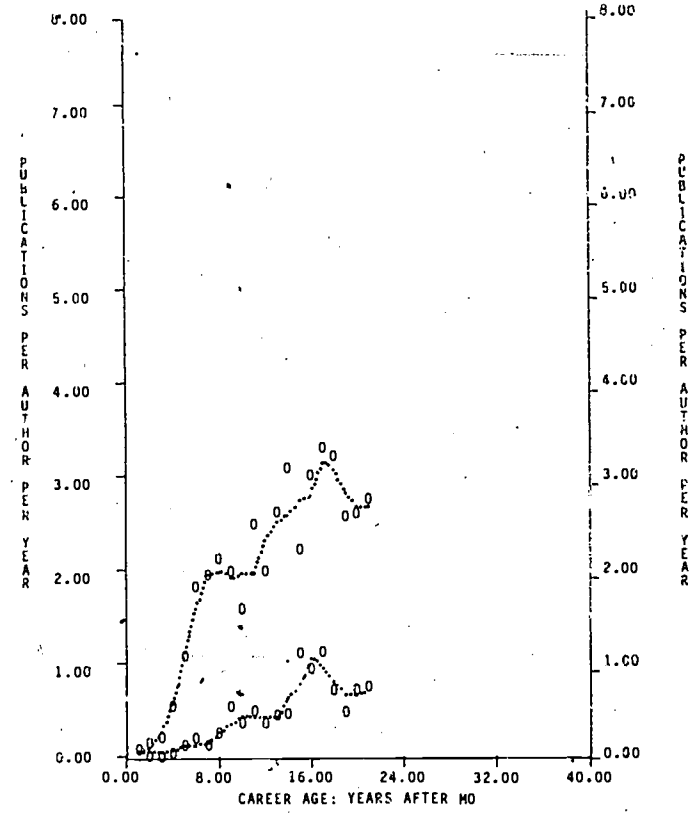


Exhibit II.28

CAREER AGE	NUMBER AUTH	PUBL RATE RAW	PUBL RATE SMOOTH	SPCL RATE RAW	SPCL RATE SMOOTH
1	17	.06	.12	.06	.03
2	17	.18	.16	.00	.02
3	17	.24	.33	.00	.02
4	17	.59	.65	.06	.08
5	17	1.12	1.20	.18	.16
6	17	1.88	1.67	.24	.18
7	17	2.00	2.02	.12	.22
8	17	2.18	2.06	.29	.33
9	17	2.00	1.92	.59	.41
10	17	1.59	2.04	.35	.49
11	17	2.53	2.04	.53	.41
12	17	2.00	2.39	.35	.45
13	17	2.65	2.59	.47	.43
14	17	3.12	2.67	.47	.71
15	17	2.24	2.80	1.18	.86
16	17	3.06	2.88	.94	1.10
17	17	3.35	3.22	1.18	.94
18	17	3.24	3.06	.71	.78
19	17	2.59	2.81	.47	.65
20	13	2.62	2.67	.77	.68
21	10	2.80	2.71	.80	.78
22	5				
23	1				

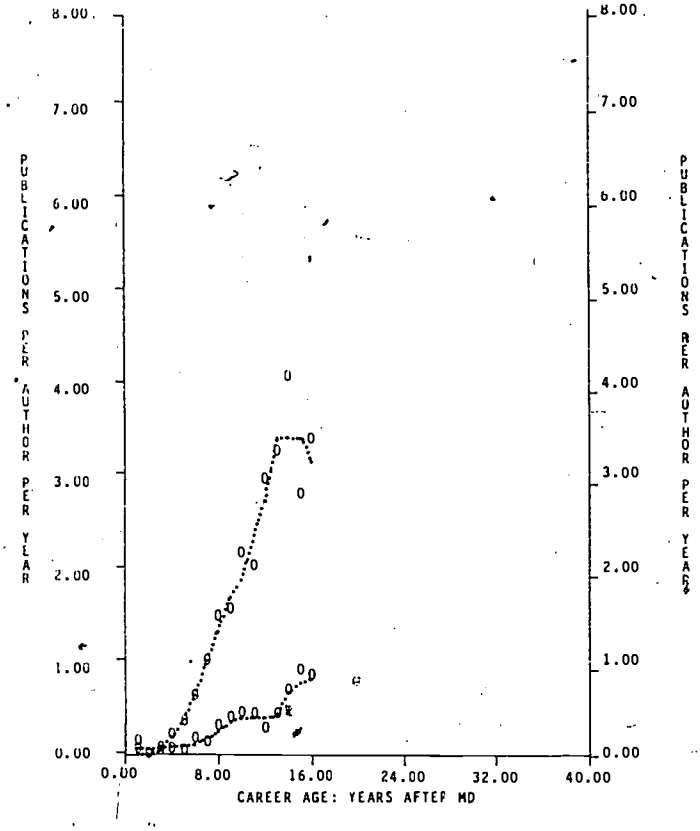
KEY

Upper line: all articles, books, etc.
Lower line: articles in special journal subset

Curves smoothed by running average of three.
Only averages of 10 or more authors are used.

BEHAVIORAL SPECIALTIES, GRADS FROM 1963-67

Exhibit II.29



CAREER AGE	NUMBER AUTH	PUBL RATE RAW	PUBL RATE SMOOTH	SPCL RATE RAW	SPCL RATE SMOOTH
1	25	.12	.06	.04	.02
2	25	.00	.07	.00	.03
3	25	.08	.11	.04	.04
4	25	.24	.24	.08	.05
5	25	.40	.44	.04	.11
6	25	.68	.71	.20	.12
7	25	1.04	1.08	.12	.23
8	25	1.52	1.39	.36	.31
9	25	1.60	1.77	.44	.43
10	25	2.20	1.95	.48	.45
11	25	2.04	2.41	.44	.40
12	25	3.00	2.79	.28	.40
13	25	3.32	3.48	.48	.51
14	25	4.12	3.41	.76	.73
15	20	2.80	3.46	.95	.85
16	13	3.46	3.13	.85	.90
17	8				
18	4				

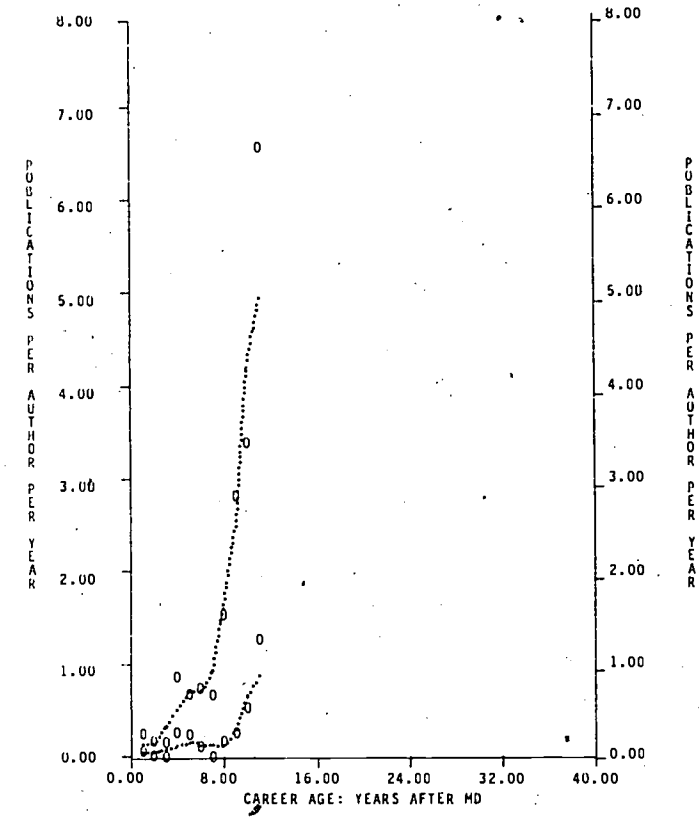
KEY

Upper line: all articles, books, etc.
Lower line: articles in special journal subset

Curves smoothed by running average of three.
Only averages of 10 or more authors are used.

BEHAVIORAL SPECIALTIES, GRADS FROM 1967-72

Exhibit II.30



CAREER AGE	NUMBER AUTH	PUBL RATE RAW	PUBL RATE SMOOTH	SPCL RATE RAW	SPCL RATE SMOOTH
1	21	.24	.19	.05	.02
2	21	.14	.17	.00	.02
3	21	.14	.40	.00	.10
4	21	.90	.57	.29	.17
5	21	.67	.78	.24	.21
6	21	.76	.70	.10	.11
7	21	.67	1.00	.00	.10
8	21	1.57	1.70	.19	.16
9	21	2.86	2.62	.29	.35
10	14	3.43	4.30	.57	.72
11	10	6.60	5.01	1.30	.94
12	6				
13	5				

KEY

Upper line: all articles, books, etc.
Lower line: articles in special journal subset

Curves smoothed by running average of three.
Only averages of 10 or more authors are used.

AAMC MEDICAL FACULTY

RESEARCH PRODUCTIVITY STUDY

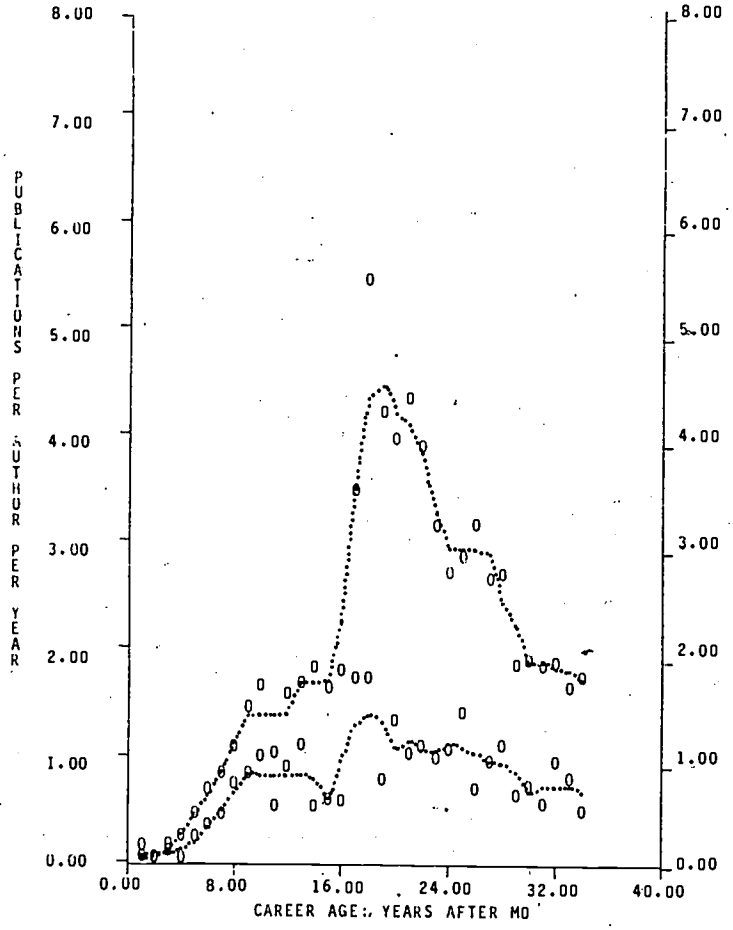
HOSPITAL BASED SPECIALITIES

EXHIBITS II.31 TO II.35

CHRONOLOGICAL AGE IS APPROXIMATELY CAREER AGE PLUS 25 YEARS

HOSPITAL-BASED SPECIALTIES, GRADS FROM 1944-52

Exhibit II.31



CAREER AGE	NUMBER AUTH	PUBL RATE RAW	PUBL RATE SMOOTH	SPCL RATE RAW	SPCL RATE SMOOTH
1	20	.15	.10	.05	.05
2	20	.05	.13	.05	.08
3	20	.20	.18	.15	.08
4	20	.30	.33	.05	.17
5	20	.50	.52	.30	.25
6	20	.75	.72	.40	.40
7	20	.90	.93	.50	.57
8	20	1.15	1.18	.80	.73
9	20	1.50	1.45	.90	.92
10	20	1.70	1.42	1.05	.83
11	20	1.05	1.47	.55	.85
12	20	1.65	1.48	.95	.88
13	20	1.75	1.77	1.15	.88
14	20	1.90	1.77	.55	.78
15	20	1.65	1.80	.65	.60
16	20	1.85	2.35	.60	1.02
17	20	3.55	3.63	1.80	1.38
18	20	5.50	4.42	1.75	1.45
19	20	4.20	4.55	.80	1.32
20	20	3.95	4.18	1.40	1.08
21	20	4.40	4.08	1.05	1.20
22	20	3.90	3.82	1.15	1.07
23	20	3.15	3.25	1.00	1.08
24	20	2.70	2.92	1.10	1.18
25	20	2.90	2.93	1.45	1.08
26	20	3.20	2.92	.70	1.05
27	20	2.65	2.87	1.00	.95
28	20	2.75	2.42	1.15	.93
29	20	1.85	2.18	.65	.86
30	18	1.94	1.88	.78	.67
31	14	1.86	1.91	.57	.78
32	12	1.92	1.80	1.00	.80
33	11	1.64	1.78	.82	.77
34	10	1.80	1.72	.50	.66
35	7				
36	3				
37	1				

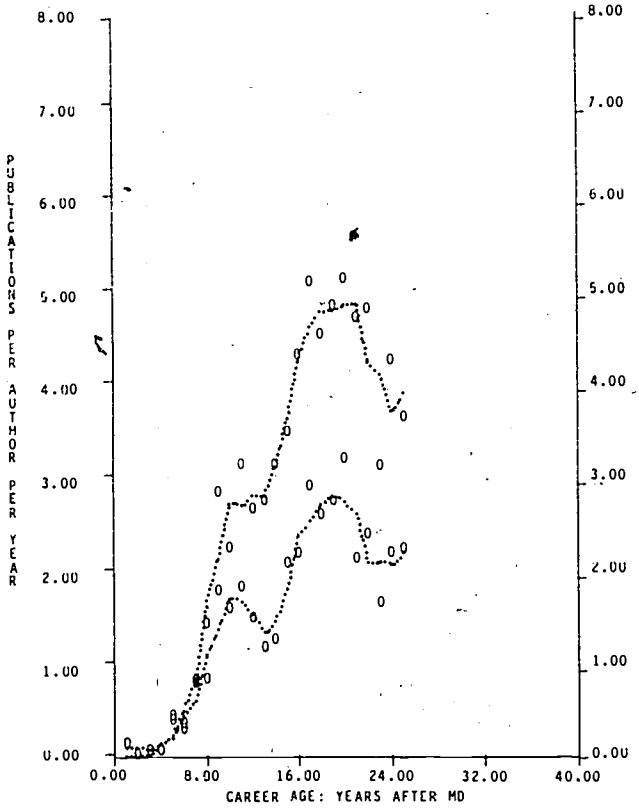
KEY

Upper line: all articles, books, etc.
Lower line: articles in special journal subset

Curves smoothed by running average of three.
Only averages of 10 or more authors are used.

HOSPITAL-BASED SPECIALTIES, GRADS FROM 1953-57

Exhibit II.32



CAREER AGE	NUMBER AUTH	PUBL RATE RAW	PUBL RATE SMOOTH	SPCL RATE RAW	SPCL RATE SMOOTH
1	17	.12	.06	.12	.06
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3	17	.06	.04	.06	.04
4	17	.06	.20	.06	.18
5	17	.47	.29	.41	.25
6	17	.35	.57	.29	.51
7	17	.88	.90	.82	.67
8	17	1.47	1.75	.88	1.18
9	17	2.88	2.20	1.82	1.43
10	17	2.24	2.76	1.59	1.76
11	17	3.18	2.69	1.88	1.65
12	17	2.65	2.86	1.47	1.51
13	17	2.76	2.86	1.18	1.31
14	17	3.18	3.16	1.29	1.53
15	17	3.53	3.69	2.12	1.88
16	17	4.35	4.33	2.24	2.43
17	17	5.12	4.67	2.94	2.59
18	17	4.53	4.84	2.59	2.76
19	17	4.88	4.86	2.76	2.86
20	17	5.18	4.92	3.24	2.71
21	17	4.71	4.90	2.12	2.59
22	17	4.82	4.22	2.41	2.06
23	17	3.12	4.08	1.65	2.10
24	17	4.29	3.68	2.24	2.05
25	11	3.64	3.97	2.27	2.25
26	8				
27	5				
28	1				

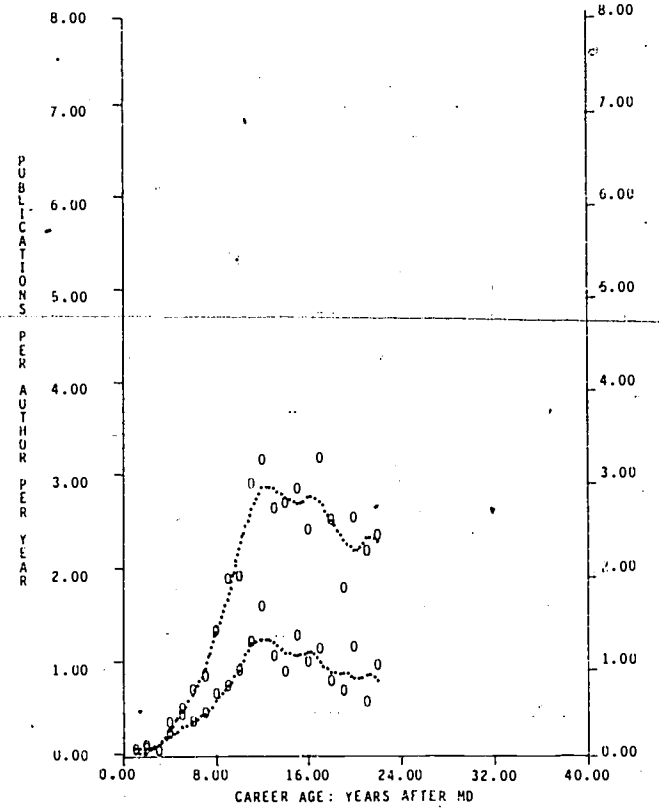
KEY

Upper line: all articles, books, etc.
Lower line: articles in special journal subset

Curves smoothed by running average of three.
Only averages of 10 or more authors are used.

HOSPITAL-BASED SPECIALTIES, GRADS FROM 1958-62

Exhibit II.33



CAREER AGE	NUMBER AUTH	PUBL RATE RAW	PUBL RATE SMOOTH	SPCL RATE RAW	SPCL RATE SMOOTH
1	29	.03	.07	.03	.05
2	29	.10	.06	.07	.05
3	29	.03	.17	.03	.11
4	29	.38	.31	.24	.24
5	29	.52	.54	.45	.34
6	29	.72	.71	.34	.43
7	29	.90	1.00	.48	.51
8	29	1.38	1.40	.69	.66
9	29	1.93	1.72	.79	.80
10	29	1.97	2.09	.93	.99
11	29	2.97	2.71	1.24	1.28
12	29	3.21	2.94	1.66	1.32
13	29	2.66	2.86	1.07	1.21
14	29	2.72	2.76	.90	1.09
15	29	2.90	2.68	1.31	1.07
16	29	2.41	2.84	1.00	1.16
17	29	3.21	2.71	1.17	.99
18	29	2.52	2.51	.79	.89
19	29	1.79	2.30	.69	.89
20	26	2.58	2.19	1.19	.82
21	21	2.19	2.39	.57	.92
22	18	2.39	2.29	1.00	.79
23	7				

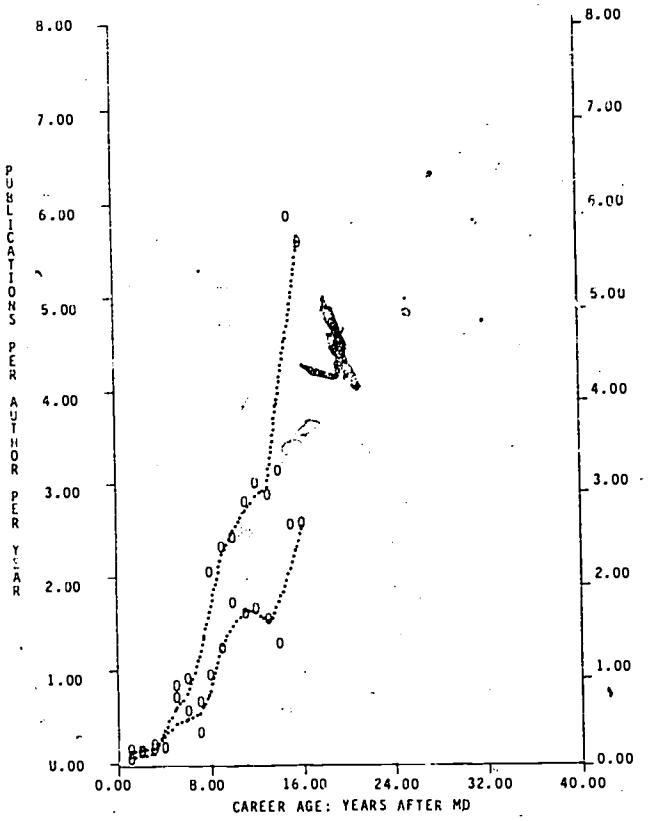
KEY

Upper line: all articles, books, etc.
Lower line: articles in special journal subset

Curves smoothed by running average of three.
Only averages of 10 or more authors are used.

HOSPITAL-BASED SPECIALTIES, GRADS FROM 1963-67

Exhibit II.34



CAREER AGE	NUMBER AUTH	PUBL RATE RAW	PUBL RATE SMOOTH	SPCL RATE RAW	SPCL RATE SMOOTH
1	21	.14	.14	.05	.10
2	21	.14	.17	.14	.13
3	21	.24	.19	.19	.17
4	21	.19	.44	.19	.38
5	21	.90	.68	.76	.51
6	21	.95	.84	.57	.56
7	21	.67	1.24	.33	.63
8	21	2.10	1.71	1.00	.87
9	21	2.38	2.32	1.29	1.35
10	21	2.48	2.57	1.76	1.56
11	21	2.86	2.79	1.62	1.70
12	21	3.05	2.94	1.71	1.63
13	21	2.90	3.05	1.57	1.52
14	21	3.19	4.01	1.29	1.82
15	16	5.93	4.91	2.60	2.16
16	10	5.60	5.77	2.60	2.60
17	9				
18	5				

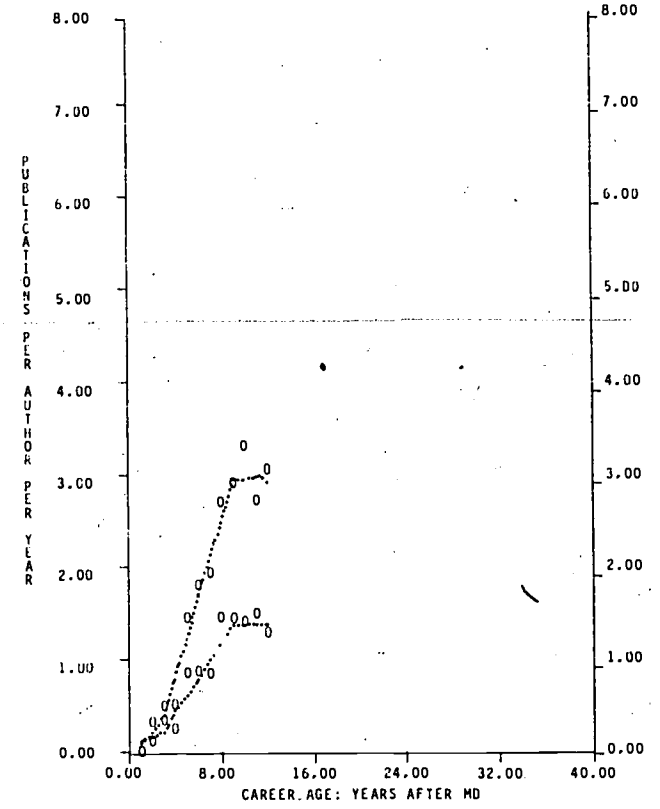
KEY

Upper line: all articles, books, etc.
Lower line: articles in special journal subset

Curves smoothed by running average of three.
Only averages of 10 or more authors are used.

HOSPITAL-BASED SPECIALTIES, GRADS FROM 1967-72

Exhibit II.35



CAREER AGE	NUMBER AUTH	PUBL RATE RAW	PUBL RATE SMOOTH	SPCL RATE RAW	SPCL RATE SMOOTH
1	20	.00	.18	.00	.08
2	20	.35	.30	.15	.18
3	20	.55	.48	.40	.27
4	20	.55	.87	.25	.52
5	20	1.50	1.30	.90	.68
6	20	1.85	1.78	.90	.88
7	20	2.00	2.20	.85	1.08
8	20	2.75	2.57	1.50	1.27
9	20	2.95	3.02	1.45	1.46
10	19	3.37	3.02	1.42	1.47
11	15	2.73	3.07	1.53	1.42
12	10	3.10	2.92	1.30	1.42
13	6				

KEY

Upper line: all articles, books, etc.
Lower line: articles in special journal subset

Curves smoothed by running average of three.
Only averages of 10 or more authors are used.

AAMC MEDICAL FACULTY

RESEARCH PRODUCTIVITY STUDY

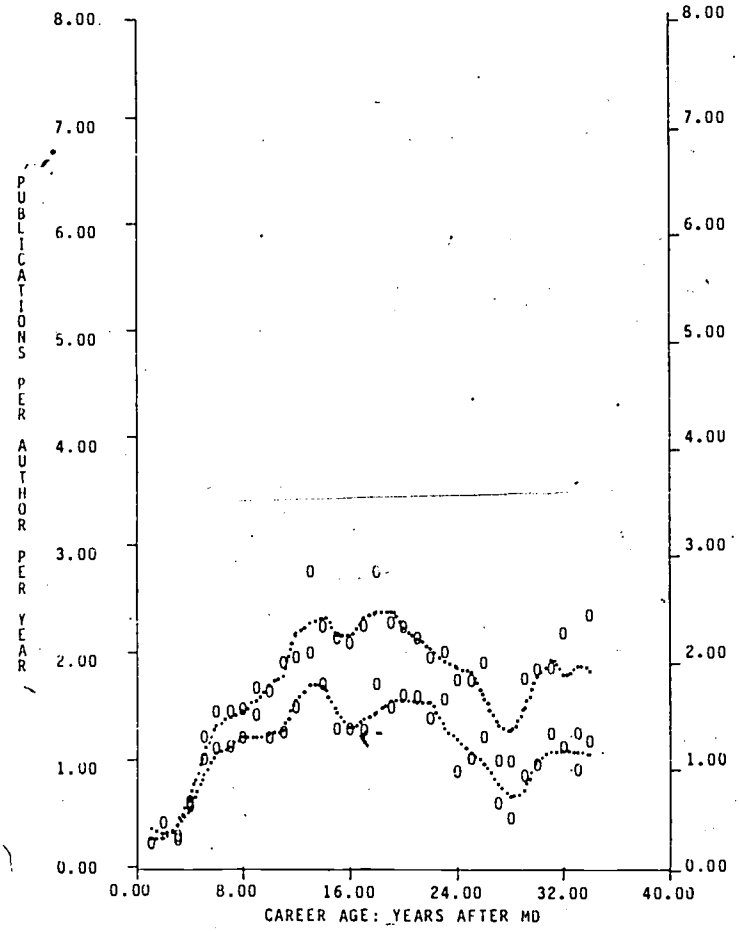
BASIC SCIENCE

EXHIBITS II.36 TO II.40

CHRONOLOGICAL AGE IS APPROXIMATELY ~~CAREER~~ AGE PLUS 26 YEARS

MDs IN BASIC SCIENCES, GRADS FROM 1944-52

Exhibit II.36



CAREER AGE	NUMBER AUTH	PUBL RATE RAW	PUBL RATE SMOOTH	SPCL RATE RAW	SPCL RATE SMOOTH
1	20	.20	.32	.20	.32
2	20	.45	.32	.45	.30
3	20	.30	.47	.25	.43
4	20	.65	.73	.60	.63
5	20	1.25	1.13	1.05	.93
6	20	1.50	1.40	1.15	1.12
7	20	1.45	1.48	1.15	1.18
8	20	1.50	1.55	1.25	1.28
9	20	1.70	1.62	1.45	1.30
10	20	1.65	1.77	1.20	1.32
11	20	1.95	1.87	1.30	1.35
12	20	2.00	2.25	1.55	1.63
13	20	2.80	2.35	2.05	1.77
14	20	2.25	2.40	1.70	1.68
15	20	2.15	2.17	1.30	1.43
16	20	2.10	2.18	1.30	1.30
17	20	2.30	2.40	1.30	1.45
18	20	2.80	2.47	1.75	1.52
19	20	2.30	2.45	1.50	1.63
20	20	2.25	2.23	1.65	1.58
21	20	2.15	2.12	1.60	1.55
22	20	1.95	2.05	1.40	1.53
23	20	2.05	1.92	1.60	1.30
24	20	1.75	1.85	.90	1.18
25	20	1.75	1.82	1.05	1.07
26	20	1.95	1.57	1.25	.97
27	20	1.00	1.32	.60	.77
28	20	1.00	1.27	.45	.65
29	20	1.80	1.56	.90	.78
30	19	1.89	1.86	1.00	1.06
31	17	1.88	2.00	1.29	1.14
32	17	2.24	1.79	1.12	1.11
33	12	1.25	1.96	.92	1.08
34	10	2.40	1.83	1.20	1.06
35	5				
36	3				
37	1				

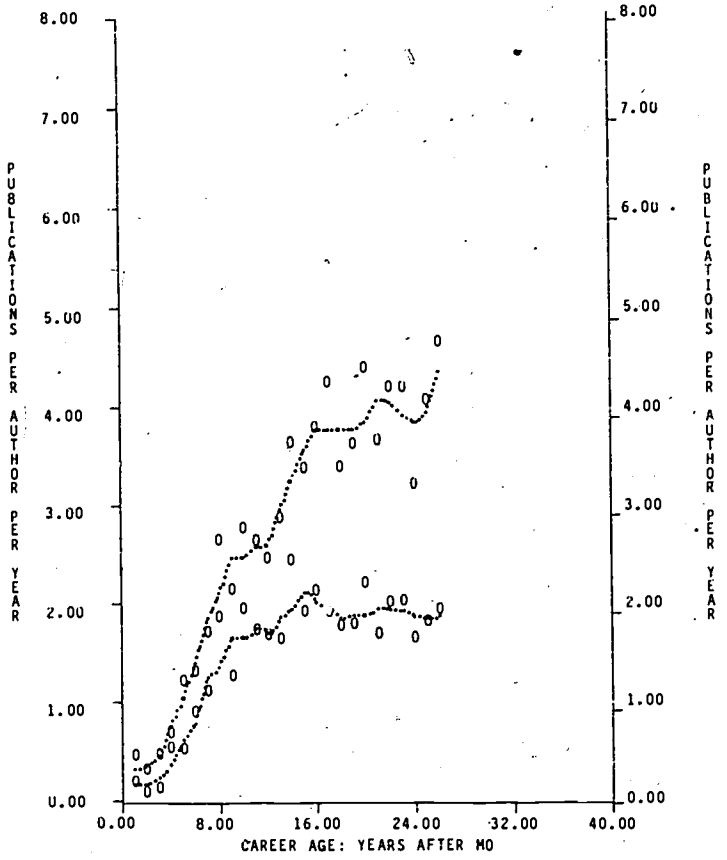
KEY

Upper line: all articles, books, etc.
Lower line: articles in special journal subset

Curves smoothed by running average of three.
Only averages of 10 or more authors are used.

MDs IN BASIC SCIENCES, GRADS FROM 1953-57

Exhibit II:37



CAREER AGE	NUMBER AUTH	PUBL RATE RAW	PUBL RATE SMOOTH	SPCL RATE RAW	SPCL RATE SMOOTH
1	22	.45	.39	.18	.14
2	22	.32	.42	.09	.14
3	22	.50	.52	.14	.27
4	22	.73	.83	.59	.42
5	22	1.27	1.12	.55	.70
6	22	1.36	1.47	.95	.88
7	22	1.77	1.94	1.14	1.33
8	22	2.68	2.20	1.91	1.44
9	22	2.18	2.55	1.27	1.73
10	22	2.82	2.53	2.00	1.67
11	22	2.61	2.64	1.73	1.80
12	22	2.45	2.67	1.68	1.68
13	22	2.91	3.02	1.64	1.94
14	22	3.68	3.33	2.50	2.02
15	22	3.41	3.65	1.91	2.20
16	22	3.86	3.86	2.18	2.00
17	22	4.32	3.86	1.91	1.95
18	22	3.41	3.80	1.77	1.83
19	22	3.68	3.85	1.82	1.95
20	22	4.45	3.94	2.27	1.92
21	22	3.68	4.14	1.68	2.02
22	22	4.27	4.06	2.09	1.94
23	22	4.23	3.91	2.05	1.92
24	22	3.23	3.86	1.64	1.85
25	15	4.13	4.03	1.87	1.83
26	11	4.73	4.43	2.00	1.93
27	8				
28	6				

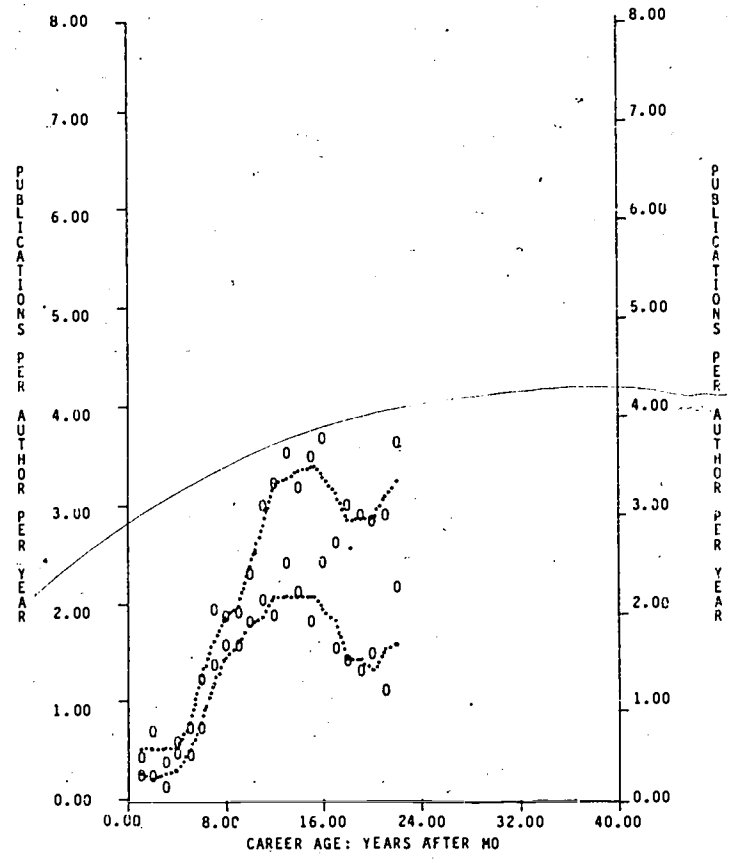
KEY

Upper line: all articles, books, etc.
Lower line: articles in special journal subset

Curves smoothed by running average of three.
Only averages of 10 or more authors are used.

MDs IN BASIC SCIENCES, GRADS FROM 1958-62

Exhibit II.38



CAREER AGE	NUMBER AUTH	PUBL RATE RAW	PUBL RATE SMOOTH	SPCL RATE RAW	SPCL RATE SMOOTH
1	26	.42	.58	.23	.23
2	26	.73	.51	.23	.19
3	26	.38	.58	.12	.28
4	26	.62	.59	.50	.36
5	26	.77	.88	.46	.58
6	26	1.27	1.35	.77	.88
7	26	2.00	1.72	1.42	1.27
8	26	1.88	1.95	1.62	1.54
9	26	1.96	2.06	1.58	1.69
10	26	2.35	2.45	1.88	1.85
11	26	3.04	2.88	2.08	1.95
12	26	3.27	3.29	1.88	2.14
13	26	3.58	3.35	2.46	2.15
14	26	3.19	3.44	2.12	2.13
15	26	3.54	3.49	1.81	2.13
16	26	3.73	3.29	2.46	1.94
17	26	2.62	3.13	1.54	1.81
18	26	3.04	2.86	1.42	1.42
19	26	2.92	2.94	1.31	1.43
20	22	2.86	2.91	1.55	1.32
21	18	2.94	3.17	1.61	1.63
22	13	3.69	3.32	2.23	1.67
23	7				

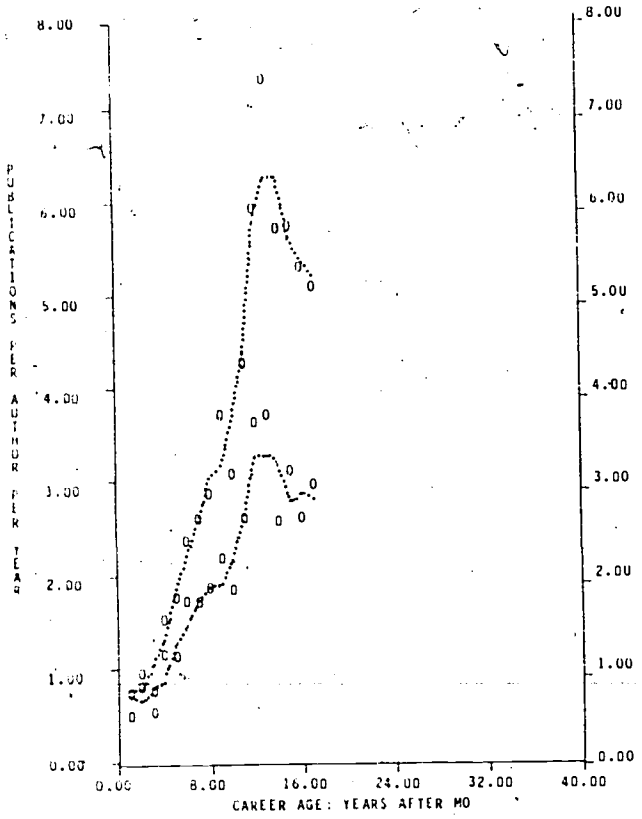
KEY

Upper line: all articles, books, etc.
Lower line: articles in special journal subset

Curves smoothed by running average of three.
Only averages of 10 or more authors are used.

MDs IN BASIC SCIENCES, GRADS FROM 1963-67

Exhibit II.39



CAREER AGE	NUMBER AUTH	PUBL RATE RAW	PUBL RATE SMOOTH	SPCL RATE RAW	SPCL RATE SMOOTH
1	22	.73	.86	.50	.68
2	22	1.00	.83	.86	.64
3	22	.77	1.12	.55	.86
4	22	1.59	1.39	1.18	.95
5	22	1.82	1.94	1.14	1.36
6	22	2.41	2.29	1.77	1.55
7	22	2.64	2.65	1.73	1.80
8	22	2.91	3.11	1.91	1.95
9	22	3.77	3.26	2.23	2.00
10	22	3.09	3.73	1.86	2.24
11	22	4.32	4.47	2.64	2.73
12	22	6.00	5.89	3.68	3.36
13	22	7.36	6.36	3.77	3.35
14	22	5.73	6.29	2.59	3.18
15	18	5.78	5.61	3.17	2.79
16	16	5.31	5.40	2.63	2.93
17	10	5.10	5.21	3.00	2.81
18	5				

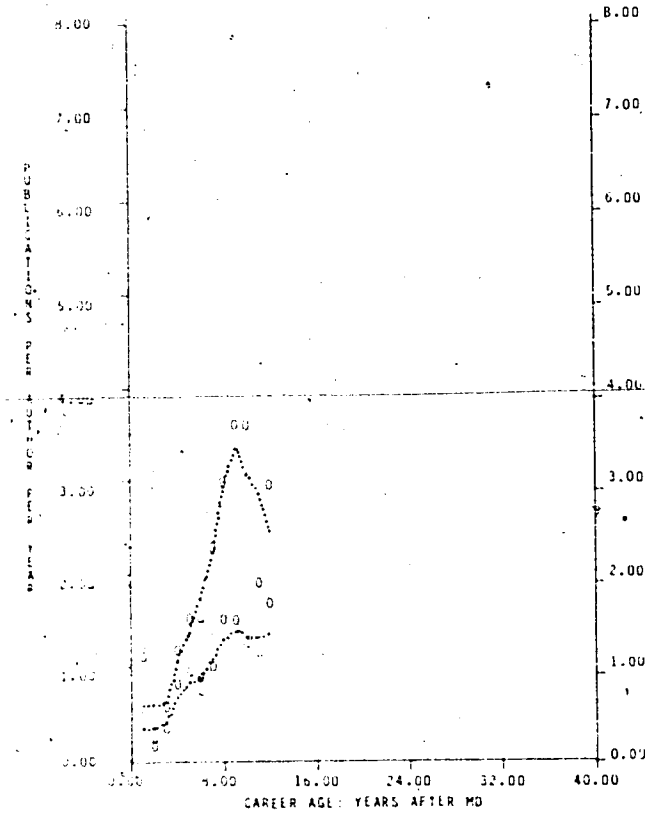
KEY

Upper line: all articles, books, etc.
Lower line: articles in special journal subset

Curves smoothed by running average of three.
Only averages of 10 or more authors are used.

MDs IN BASIC SCIENCES, GRADS FROM 1967-72

Exhibit II.40



CAREER AGE	NUMBER AUTH	PUBL RATE RAW	PUBL RATE SMOOTH	SPCL RATE RAW	SPCL RATE SMOOTH
1	21	1.10	.67	.48	.31
2	21	.24	.65	.14	.33
3	21	.62	.70	.38	.46
4	21	1.24	1.14	.86	.75
5	21	1.57	1.46	1.00	.92
6	21	1.57	1.83	.90	.93
7	21	2.33	2.32	1.05	1.17
8	21	3.05	3.02	1.57	1.38
9	21	3.67	3.45	1.52	1.45
10	16	3.63	3.07	1.25	1.31
11	13	1.92	2.85	1.15	1.38
12	11	3.00	2.46	1.73	1.44
13	6				

KEY

Upper line: all articles, books, etc.
Lower line: articles in special journal subset

Curves smoothed by running average of three.
Only averages of 10 or more authors are used.

upsurge in research activity. Third, those physicians who graduated between 1944 and 1952 had clearly different publication profiles than physicians in all subsequent eras. Early graduates regardless of specialty group, seemed to increase their publication rates slowly over a period of about 10 to 15 years after graduation. More recent graduates achieve a much higher rate of publication in a shorter time after graduation from medical school.

Composite profiles were developed for each of the five specialty groups so that models of projected output might be developed. This projection of research output as measured by publications will be considered in more detail in section I.1 of this chapter.

We also investigated the effect of achieving tenure on research output as measured by publication rate and also the question whether tenure affected the order of authorship of manuscripts:

- Exhibit II.41 shows there was no apparent effect on publication rate by promotion to associate professor, a rank we deemed equivalent to achieving tenure. The rate of "all publications" as well as the publication rate in "select research" journals was not affected by promotion in academic rank.
- It is commonly held that as faculty grow older they are more likely to shift from first or sole authorship of research publications to the last or "senior author" position. The data we have obtained allow us, in passing, to confirm that this common wisdom is indeed correct. It is beyond the scope of this report to show all the data obtained on this point but Exhibit II.42 gives an example for medical specialists which is similar to that found for all specialty groups.

Exhibit II.41

PUBLICATION RATE IN YEARS BEFORE AND AFTER TENURE WAS CONFERRED*

	"All Publications"			"Select Research" Publications		
	Two Years Before	Year Of Tenure	Two Years After	Two Years Before	Year Of Tenure	Two Years After
Medical	3.18	3.67	3.82	1.73	2.14	1.96
Surgical	3.02	4.02	3.92	0.80	0.89	0.79
Behavioral	2.23	3.75	3.92	0.25	0.74	0.48
Hospital-Based	3.24	3.23	3.25	1.77	1.61	1.63
Basic Science	2.58	3.16	3.80	1.70	2.11	2.37

*i.e., years in which individual was promoted to associate professor

Exhibit II.42

POSITION OF AUTHORSHIP

Medical Specialists

	5th year After MD*	15th year After MD*	25th year After MD*
Percent of publications in which individual was first or sole author	51.2%	44.1%	43.5%
Percent of publications in in which individual was last author	13.4%	38.2%	41.4%

*Publication rate was averaged over the fourth to sixth, fourteenth to sixteenth or twenty-fourth to twenty-sixth years after MD

H. Career Age Distribution

There is considerable interest in the question whether the faculty is growing progressively older or "graying." Such a question has significant implications for biomedical research because many major research advances are made by young individuals. We have examined this question using records of age, year of M.D. and specialty for all MDs on the Faculty Roster System Career age is defined as years after graduation from medical school. The changing career age distribution of all MD faculty is graphically displayed in Exhibit II.43. The career age distributions of faculty in each specialty group in each year over the decade 1968 to 1978 are shown in Exhibits II.44 through II.48. It appears tha even though faculties have been growing at a rate of six percent per year, they have become progressively older in the past decade. A word of caution, however, is in order. An unknown fraction of the observed "graying" trend may be due to an artifact of the Faculty Roster System's method of recreating rosters for past years from incomplete rank history data. Thus, while the career ages of faculty tallied for 1978 exclude all instructors, those tallied for 1968 may include instructors. This is likely to make the faculty in 1968 (and other years before 1978) appear to be younger in comparison with the 1978 faculty.

Projections of physician faculty ages for the comirg decade 1980-1990 were calculated based upon the recent average rate of hiring and attrition due to death, entering private practice, retireing, or other reasons. (The projections are not based upon observed trends in previous "graying.") We have assumed that these age-specific hiring and attrition rates will remain constant, and that one of three conditions would also pertain, i.e., that

Exhibit II.43

Age Distribution of All MD Faculty

(Chronological Age Equals Career Age Plus 25 Years)

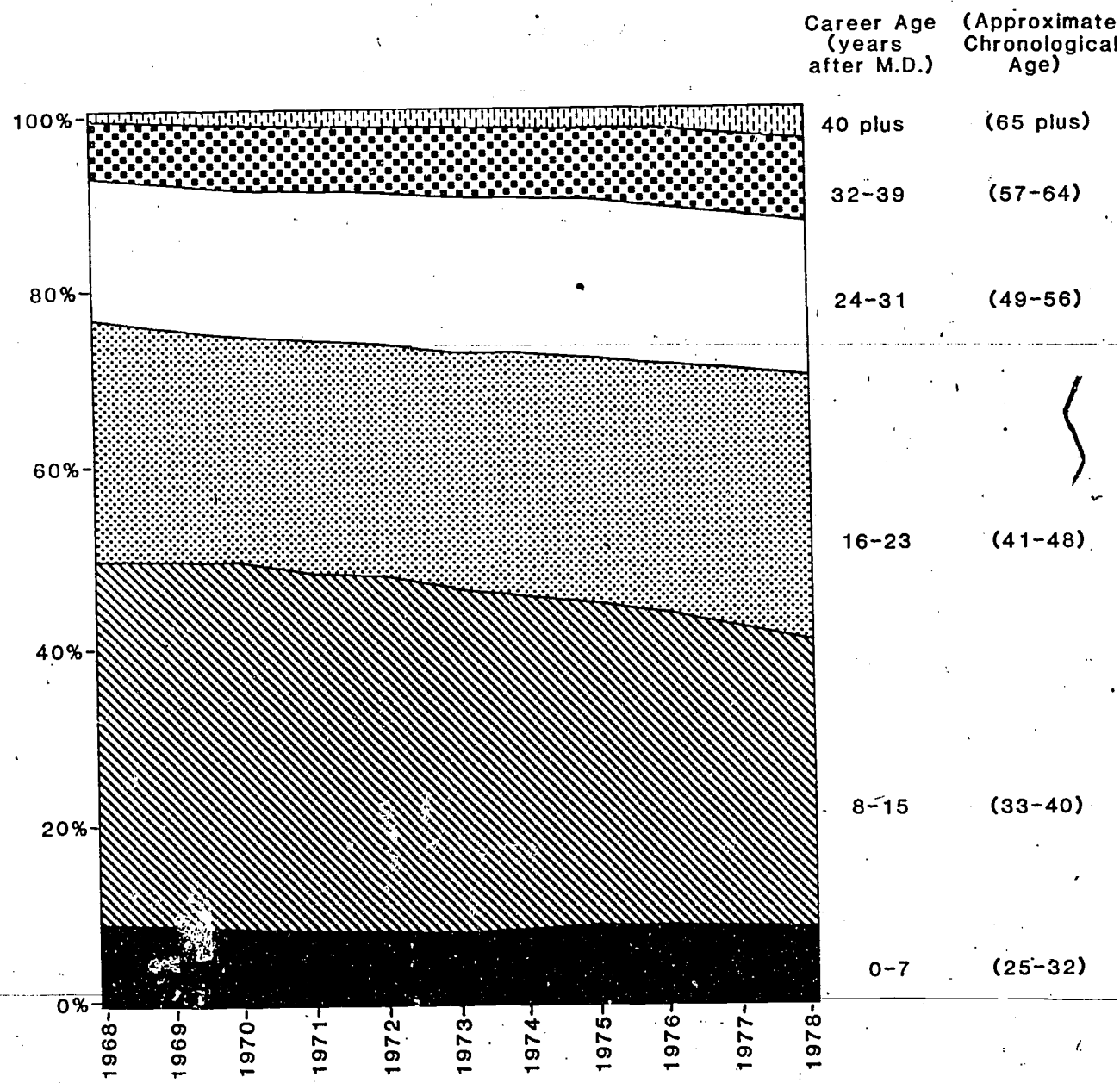


EXHIBIT II.44

AGE DISTRIBUTION OF FACULTY IN MEDICAL SPECIALTIES, 1968-1978
(CHRONOLOGICAL AGE EQUALS CAREER AGE PLUS 25 YEARS)

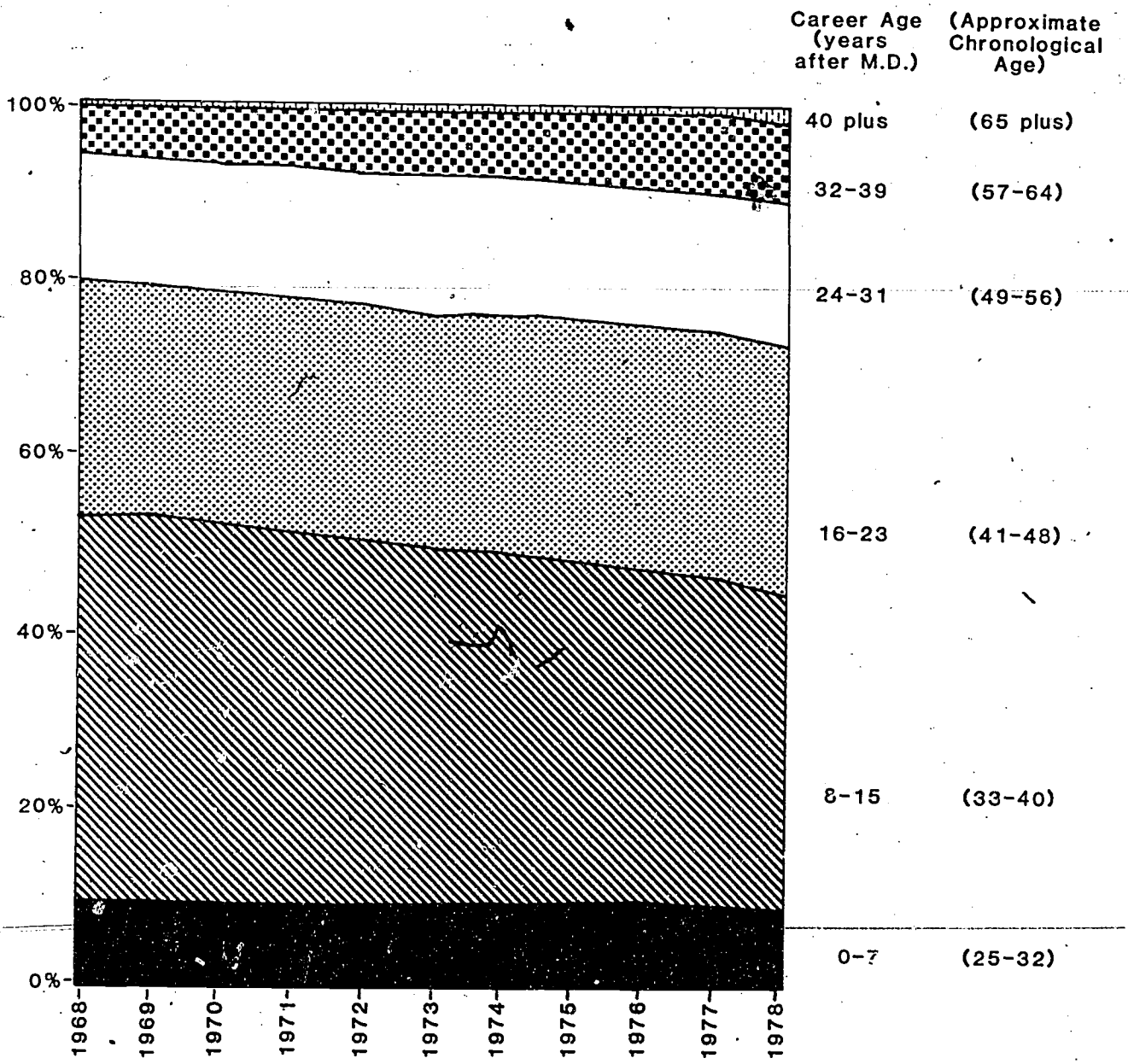


Exhibit II.45

Age Distribution of Faculty in Surgical Specialties

(Chronological Age Equals Career Age Plus 25 Years)

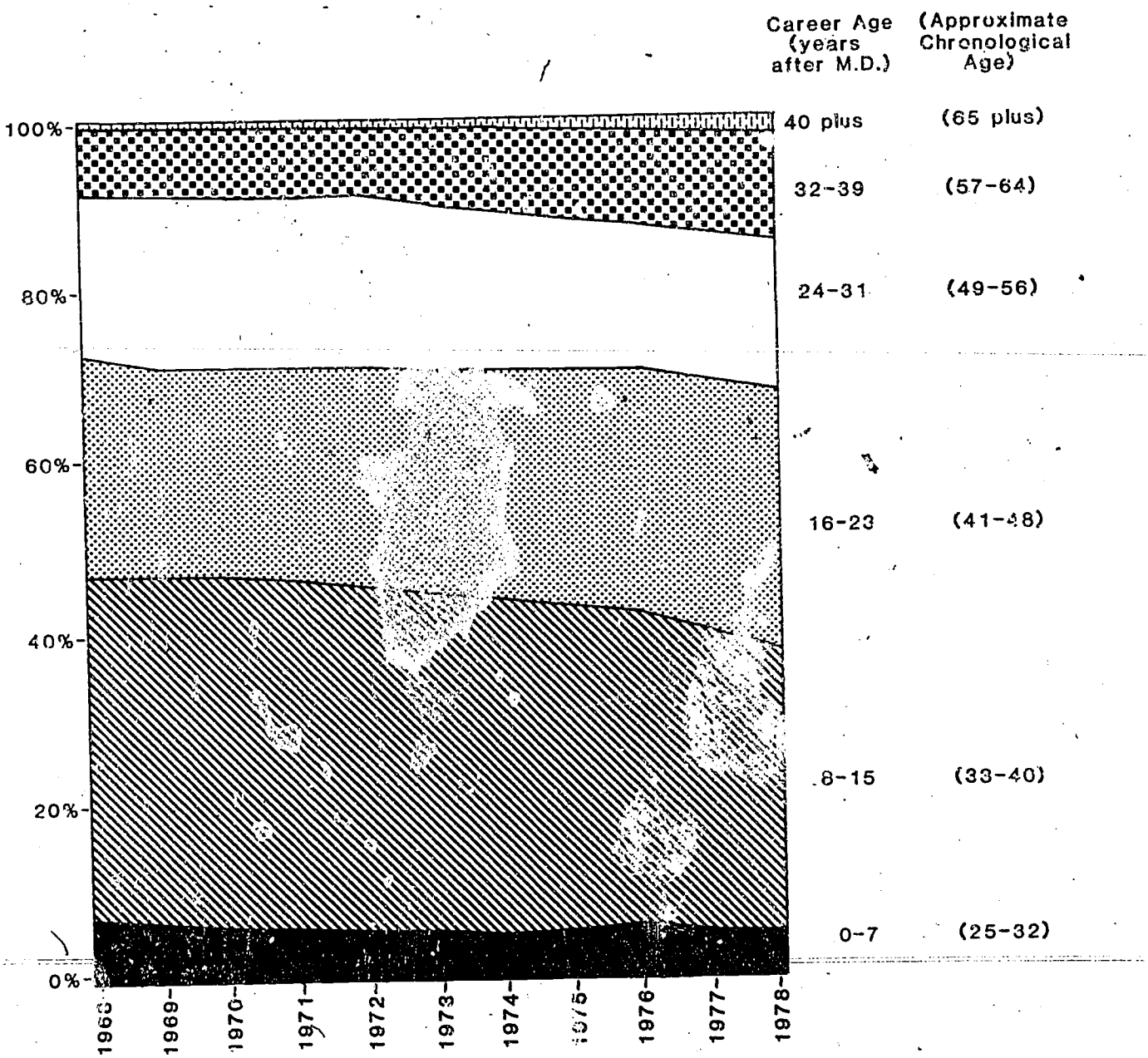


EXHIBIT II.46

AGE DISTRIBUTION OF FACULTY IN BEHAVIORAL SPECIALISTS

(CHRONOLOGICAL AGE EQUAL CAREER AGE PLUS 25 YEARS)

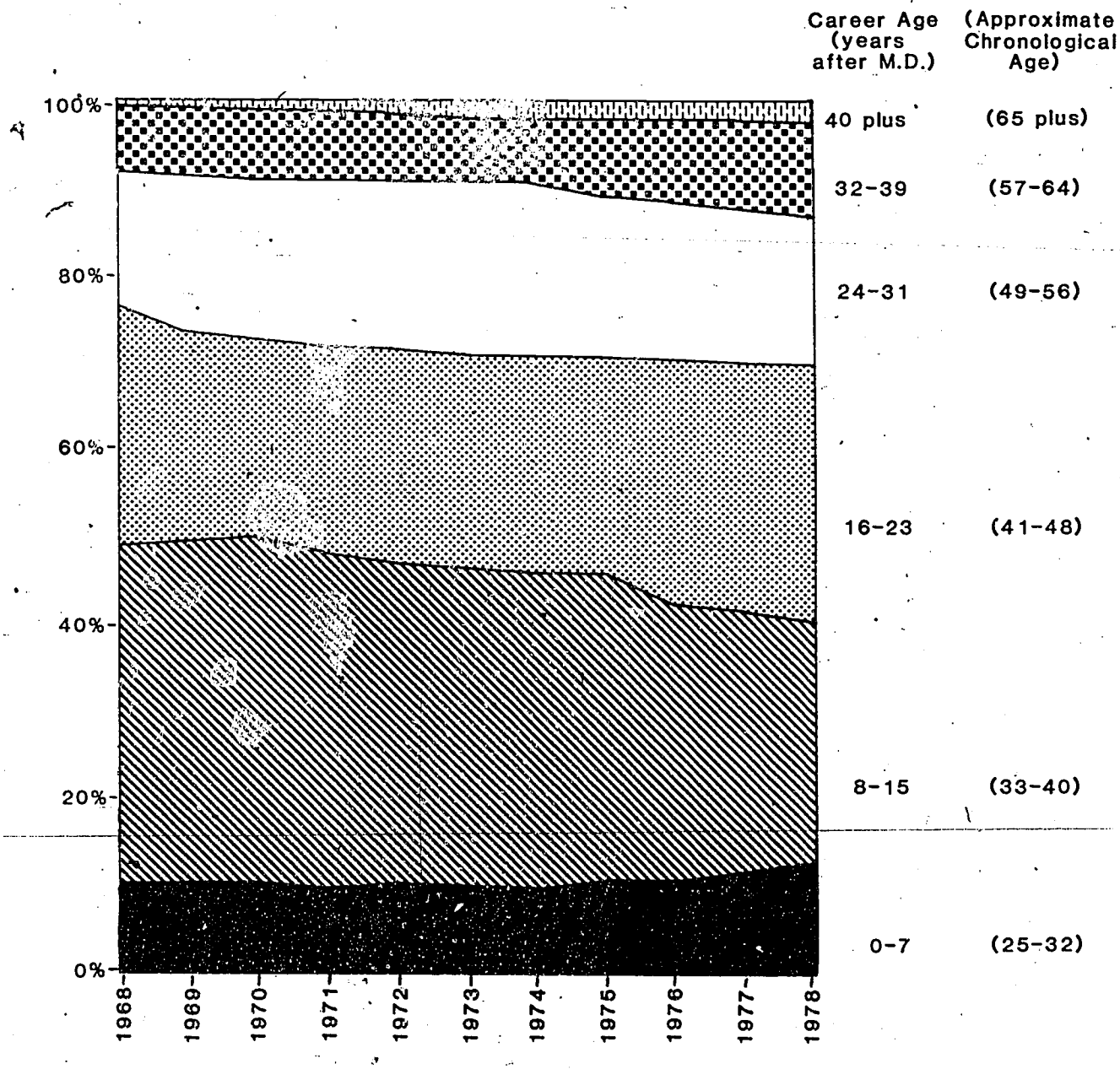


EXHIBIT II.47

AGE DISTRIBUTION OF FACULTY IN HOSPITAL-BASED SPECIALTIES

(CHRONOLOGICAL AGE EQUALS CAREER AGE PLUS 25 YEARS)

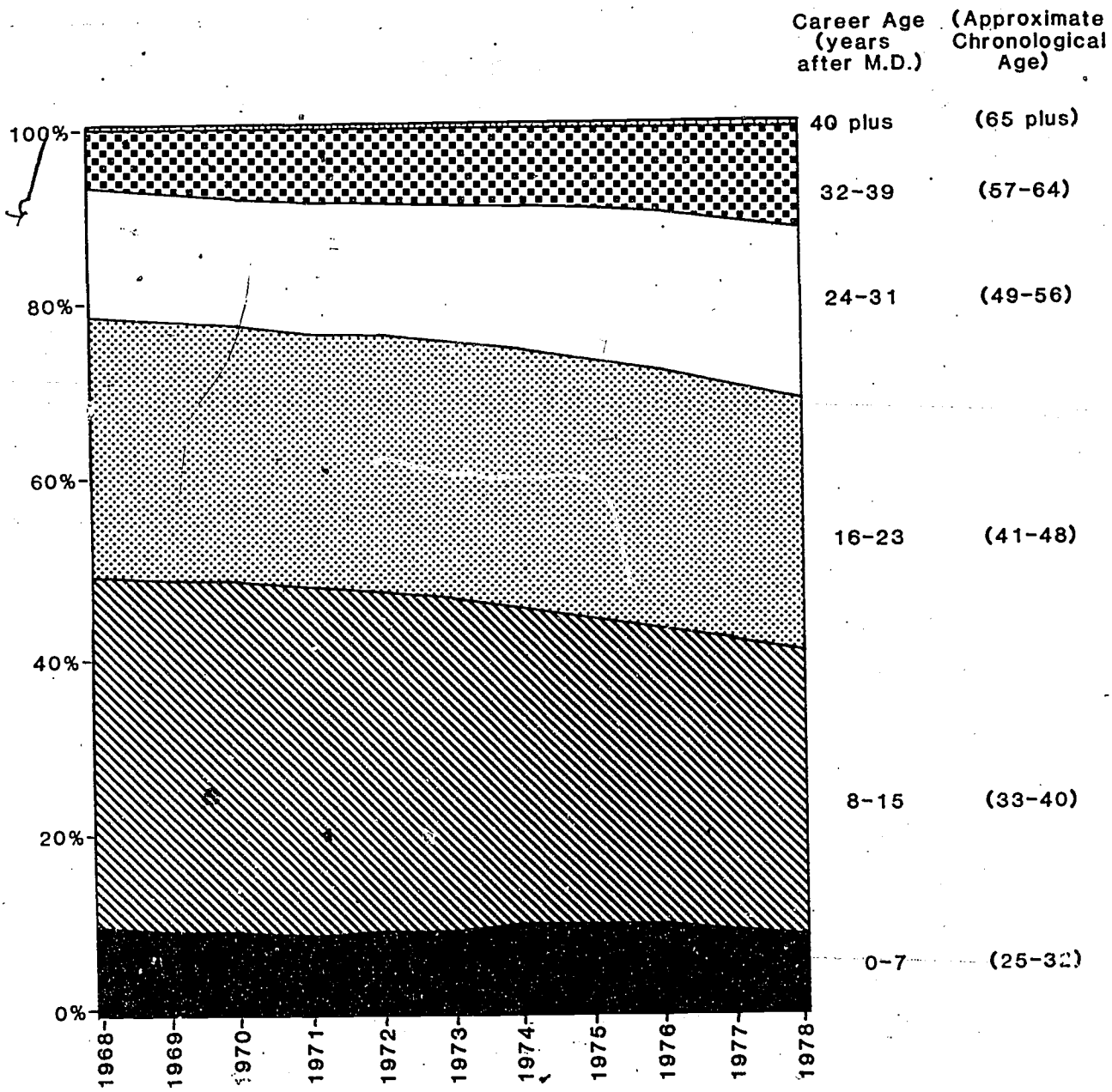
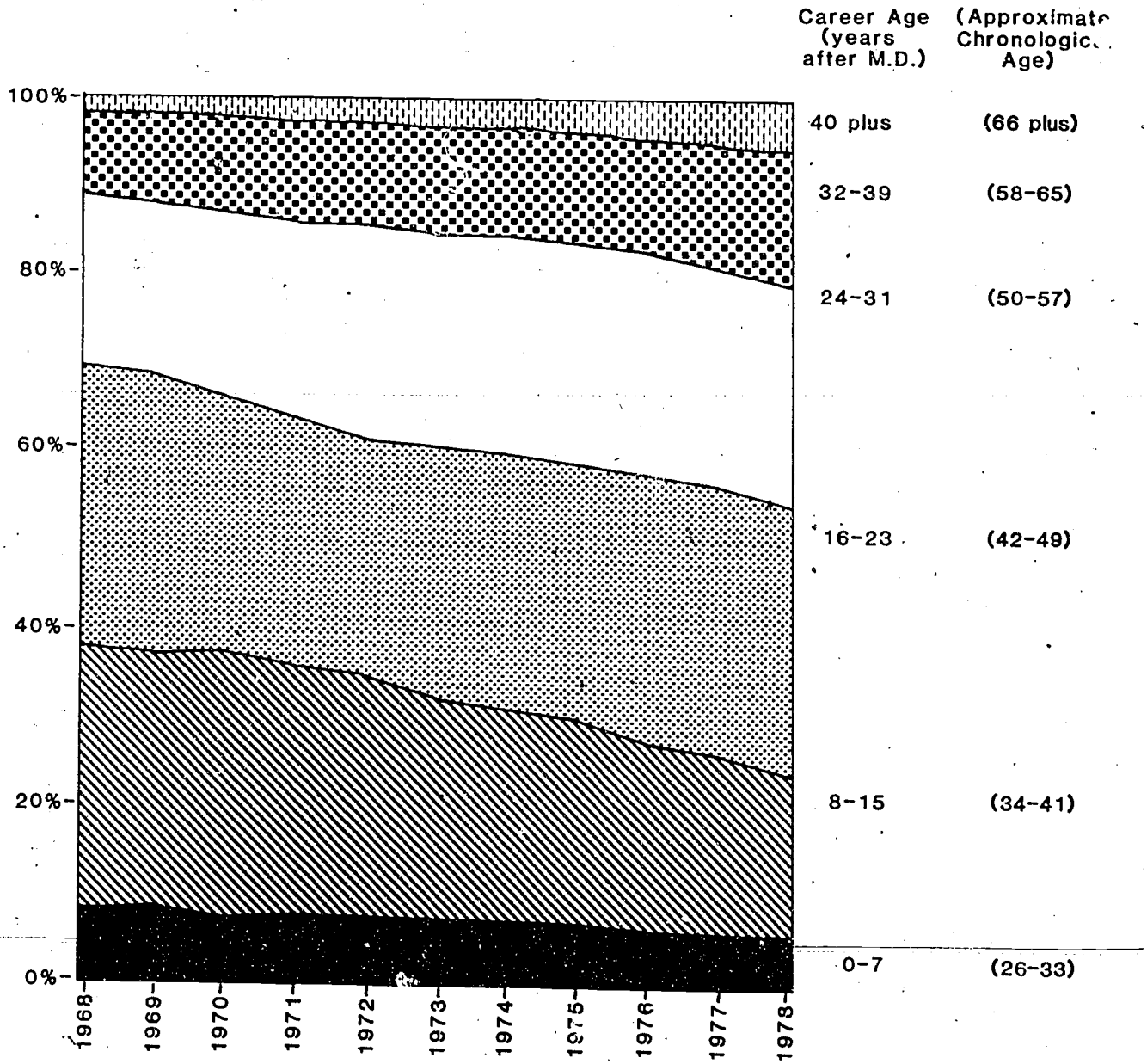


EXHIBIT II.48

AGE DISTRIBUTION OF MD FACULTY IN BASIC SCIENCES

(CHRONOLOGICAL AGE EQUALS CAREER AGE PLUS 26 YEARS)



there would be zero, three percent or six percent growth of faculty. Finally, we have assumed that 25 percent of faculty reaching age 65 would retire in the first year and 25 percent in each succeeding year.

Based on these assumptions, the projected career age distributions of all MD faculty for 1980 to 1990 are shown in Exhibits II.49 through II.51. At a six percent growth rate faculty age distribution remains constant, but the faculty ages at three percent growth and ages more quickly at zero growth. These projections of age were made not only to examine the "graying" question but also as a necessary step on the prediction of research output (next section).

I. Projected Research Output

The main purpose of the analyses reported in this chapter is to assess the impact of the "graying" of the physician faculty in our medical schools on future production, dissemination and application of new knowledge in the biosciences. The focus of the analysis is on that parameter which we are able to measure: the dissemination of research findings through the publication of journal articles and books.

Our projection model is based on four statistical assumptions describing:

(1) The publication rates of physicians throughout their careers,

(2) The career age distribution of all physicians hired by medical schools for the first time in a given year,

(3) The deactivation rates of physicians due to the combination of death, retirement and other loss from medical faculties at varying career ages, and

(4) The expected overall growth rate of the faculties at all American medical schools.

EXHIBIT II.49

AGE DISTRIBUTION OF ALL MD FACULTY,

1980-1990, ASSUMING ZERO GROWTH

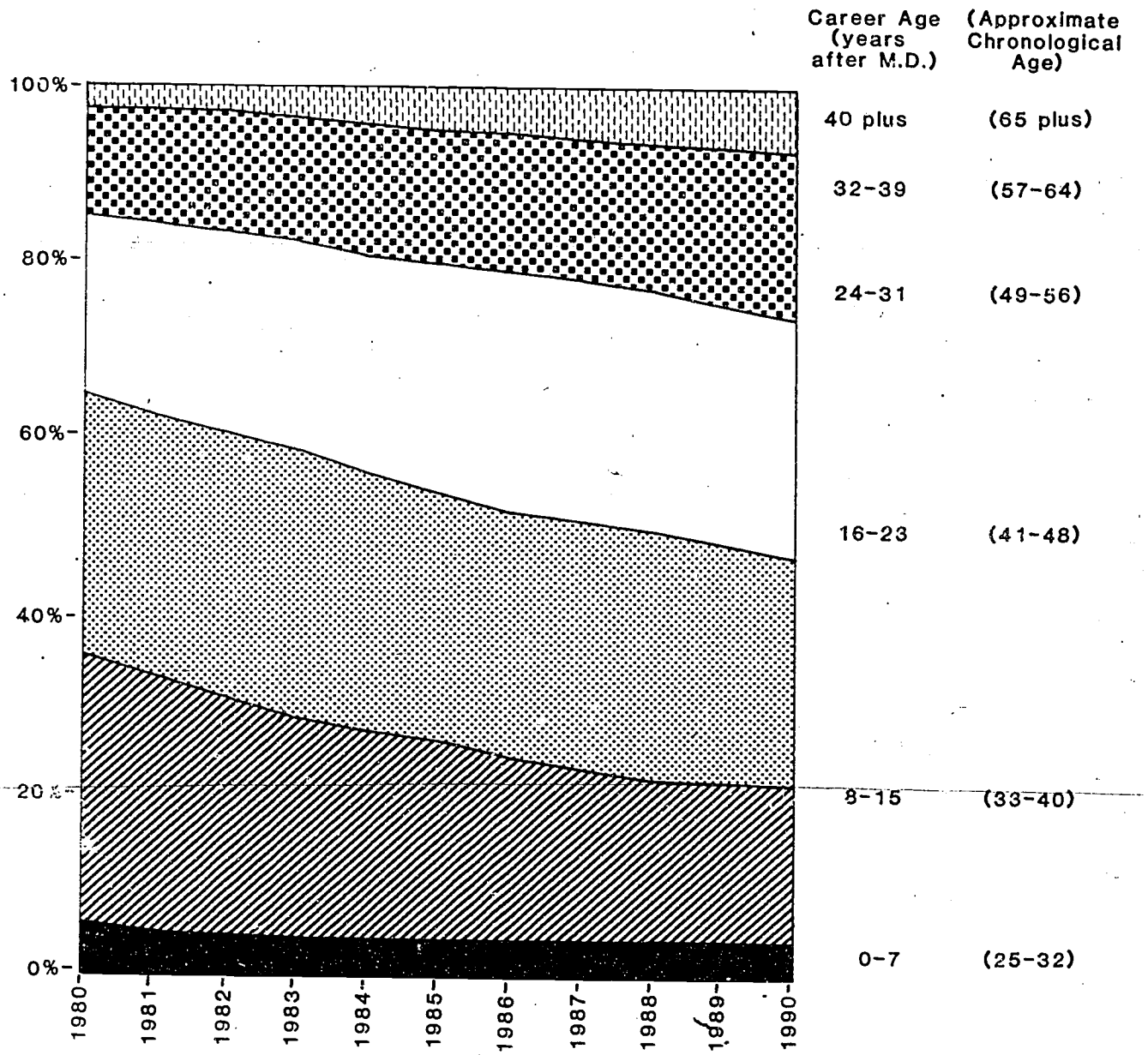


EXHIBIT II.50

PROJECTED AGE DISTRIBUTION OF ALL MD FACULTY, 1980-1990, ASSUMING A THREE PERCENT ANNUAL GROWTH RATE

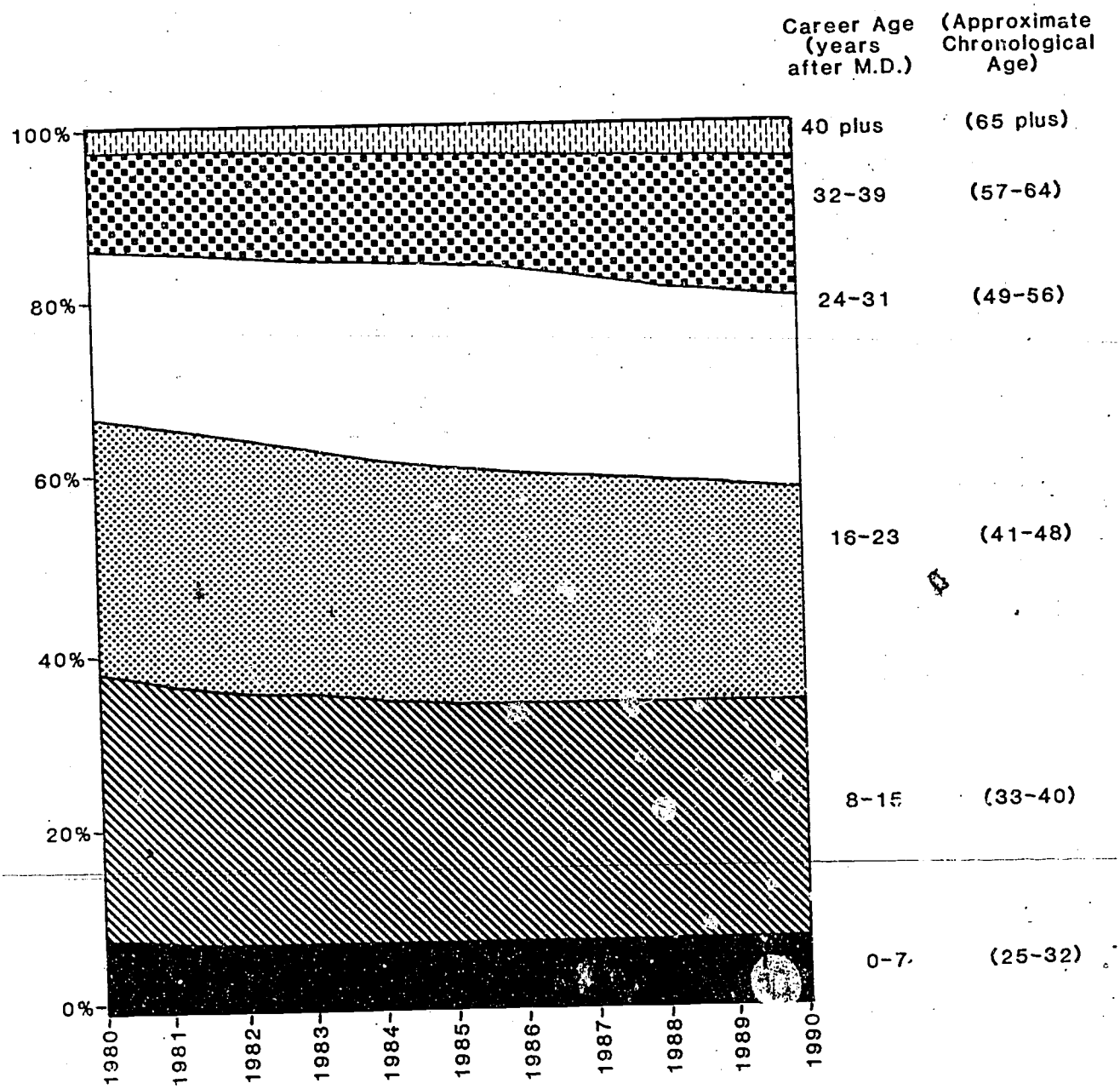
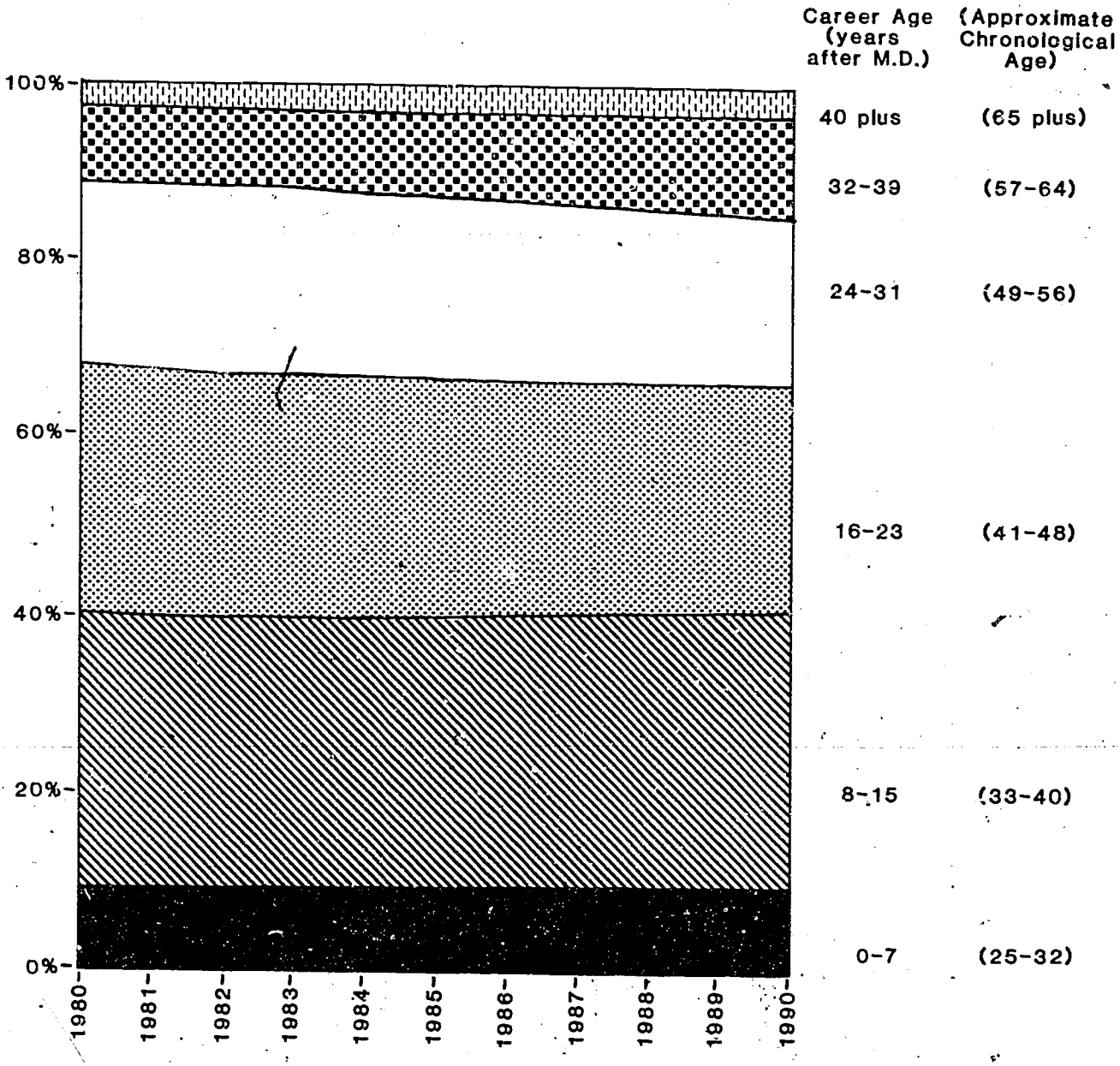


EXHIBIT II.51

PROJECTED AGE DISTRIBUTION OF ALL MD FACULTY,
1980-1990, ASSUMING A SIX PERCENT ANNUAL GROWTH RATE



The parameters of these assumptions and the method of projection are detailed in the following paragraphs.

1. Publication Rates. The career-long total and "select research" publication rates used in the projections of future annual numbers of publications are derived from the publication rates of the seven specialty groups in the different graduation eras. For a given specialty the publication profile is composed as follows:

Career Ages	Composite publication rate based on average rates of graduates from
1-5	1967-1972
6-10	1963-1966 and 1967-1972
11-15	1958-1962 and 1963-1966
16-20	1953-1957 and 1958-1962
21-25	1944-1952 and 1953-1957
26-34	1944-1952
34 and over	1944-1952, extrapolated

The two composite publication profiles ("all" and "select research") for each of the five specialty groups are presented in Exhibits II.52 to II.56.

2. Accession "Rates." Column A of Exhibit II.57 presents the percentage of all newly hired MD faculty (first time) who are of each career age (elapsed years after earning the MD degree). For example, 10.02 percent of all newly hired faculty in a given year will be five years out of medical school. The distribution is the average of the three distributions for 1976, 1977 and 1978. An adjustment was made for career

AAMC MEDICAL FACULTY

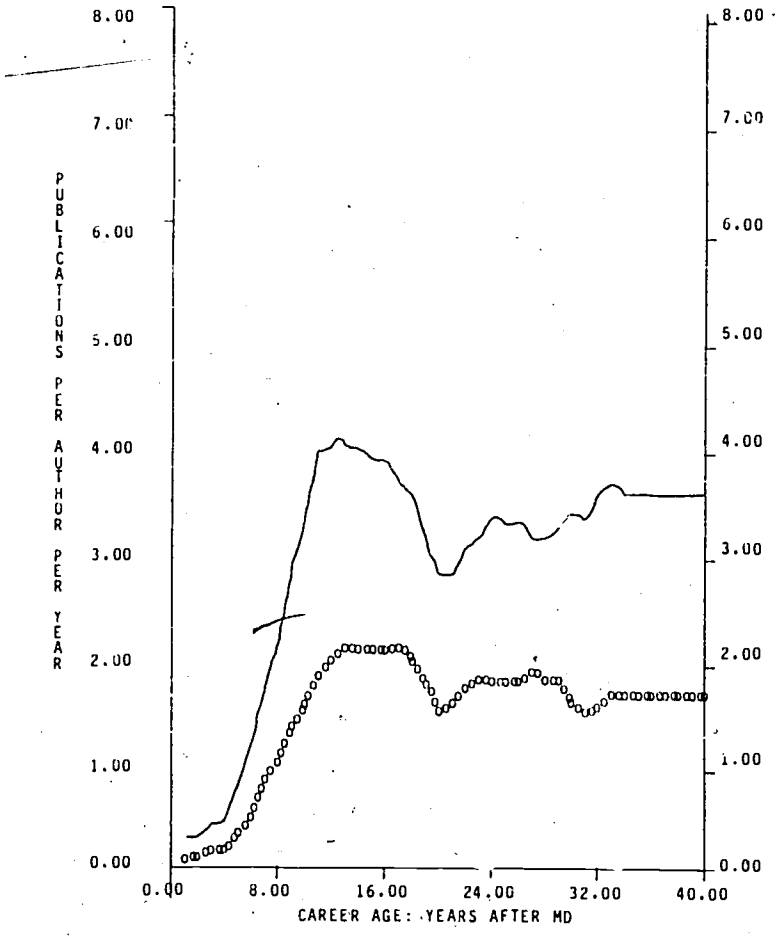
RESEARCH PRODUCTIVITY STUDY

COMPOSITE PROFILE OF EXPECTED INDIVIDUAL OUTPUT

EXHIBITS II.52 TO II.56

Exhibit II.52

MEDICAL SPECIALTIES, GRADS FROM 1944-72



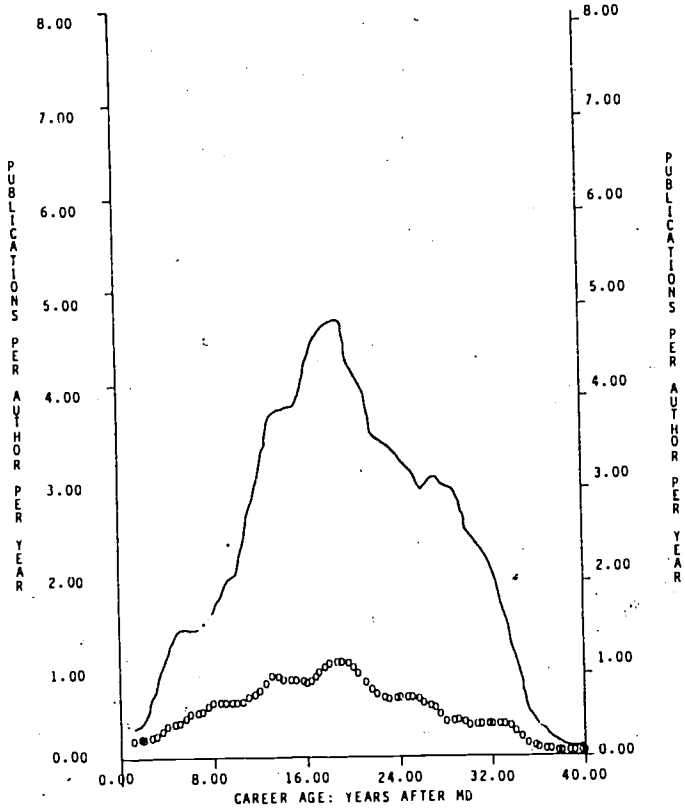
CAREER AGE	COMPOSITE PUBL RATE	COMPOSITE SPECIAL RATE
1	.185	.111
2	.173	.123
3	.309	.185
4	.333	.136
5	.725	.344
6	1.070	.508
7	1.628	.880
8	2.019	1.052
9	2.770	1.372
10	3.193	1.580
11	3.807	1.876
12	3.841	1.997
13	4.117	2.118
14	4.155	2.034
15	4.052	2.039
16	4.049	2.027
17	3.840	2.114
18	3.709	1.893
19	3.237	1.665
20	2.929	1.423
21	2.958	1.578
22	3.337	1.741
23	3.425	1.840
24	3.631	1.737
25	3.419	1.701
26	3.513	1.781
27	3.300	1.900
28	3.350	1.717
29	3.496	1.717
30	3.645	1.495
31	3.470	1.412
32	3.841	1.533
33	3.938	1.682
34	3.700	1.600
35	3.700	1.600
36	3.700	1.600
37	3.700	1.600
38	3.700	1.600
39	3.700	1.600
40	3.700	1.600

KEY

Upper line: all articles, books, etc.
Lower line: articles in special journal subset

Exhibit II.53

SURGICAL SPECIALTIES, GRADS FROM 1944-72



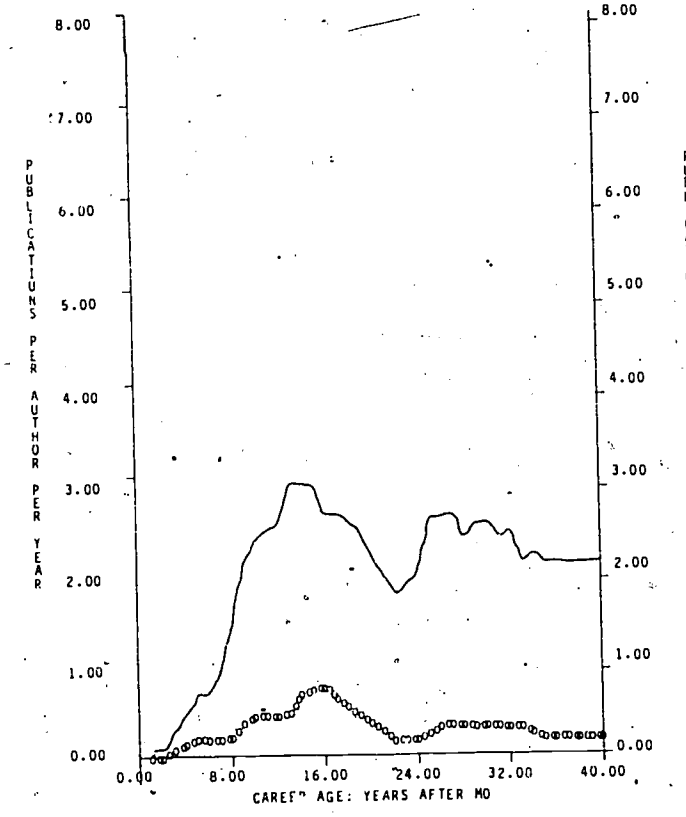
CAREER AGE	COMPOSITE PUBL RATE	SPECIAL RATE
1	.364	.227
2	.409	.242
3	.773	.288
4	1.136	.394
5	1.439	.439
6	1.386	.530
7	1.432	.561
8	1.614	.659
9	1.954	.657
10	2.000	.592
11	2.629	.709
12	3.071	.786
13	3.678	.956
14	3.816	.813
15	3.866	.808
16	4.253	.775
17	4.667	.975
18	4.783	1.058
19	4.827	1.086
20	4.185	.946
21	3.963	.759
22	3.426	.636
23	3.341	.577
24	3.183	.626
25	3.045	.649
26	2.788	.545
27	3.045	.485
28	2.879	.318
29	2.808	.371
30	2.297	.286
31	2.161	.355
32	2.008	.363
33	1.514	.352
34	.981	.222
35	.533	.083
36	.300	.040
37	.200	.020
38	.100	.010
39	.060	.000
40	.040	.000

KEY

Upper line: all articles, books, etc.
Lower line: articles in special journal subset.

Exhibit II.54

BEHAVIORAL SPECIALTIES, GRADS FROM 1944-72

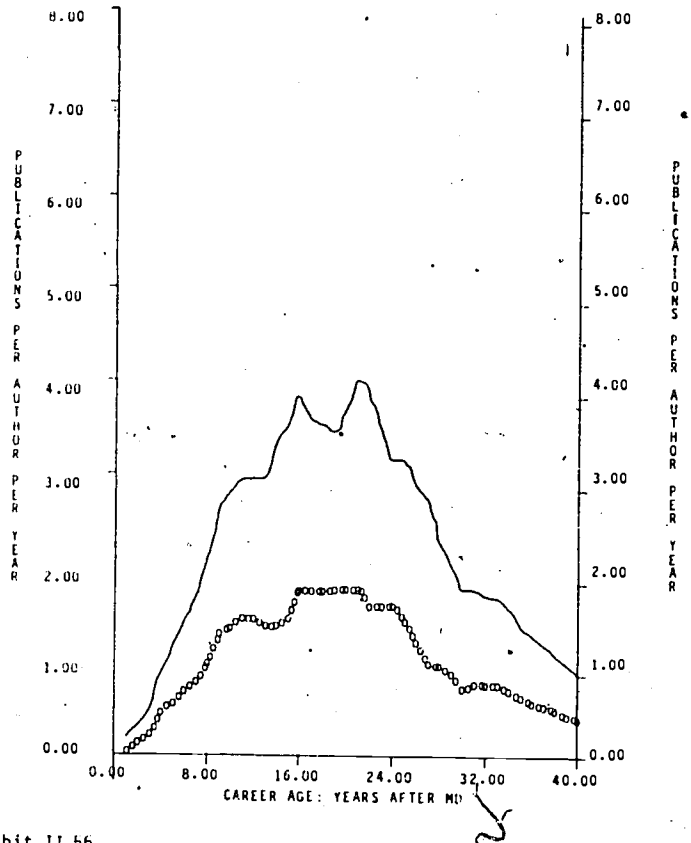


CAREER AGE	COMPOSITE PUBL RATE	SPECIAL RATE
1	.190	.024
2	.175	.016
3	.397	.095
4	.571	.175
5	.764	.224
6	.747	.149
7	1.040	.161
8	1.543	.233
9	2.196	.388
10	2.443	.458
11	2.533	.442
12	2.589	.425
13	3.034	.469
14	3.040	.718
15	2.936	.748
16	2.622	.771
17	2.671	.558
18	2.569	.479
19	2.446	.380
20	2.169	.286
21	1.968	.200
22	1.762	.103
23	1.929	.127
24	2.071	.147
25	2.667	.242
26	2.683	.329
27	2.698	.349
28	2.381	.302
29	2.606	.254
30	2.631	.295
31	2.385	.263
32	2.518	.243
33	2.110	.260
34	2.273	.318
35	2.100	.250
36	2.100	.260
37	2.100	.260
38	2.100	.260
39	2.100	.260
40	2.100	.260

KEY

Upper line: all articles, books, etc.
Lower line: articles in special journal subset.

Exhibit II.55 HOSPITAL-BASED SPECIALTIES, GRADS FROM 1944-72

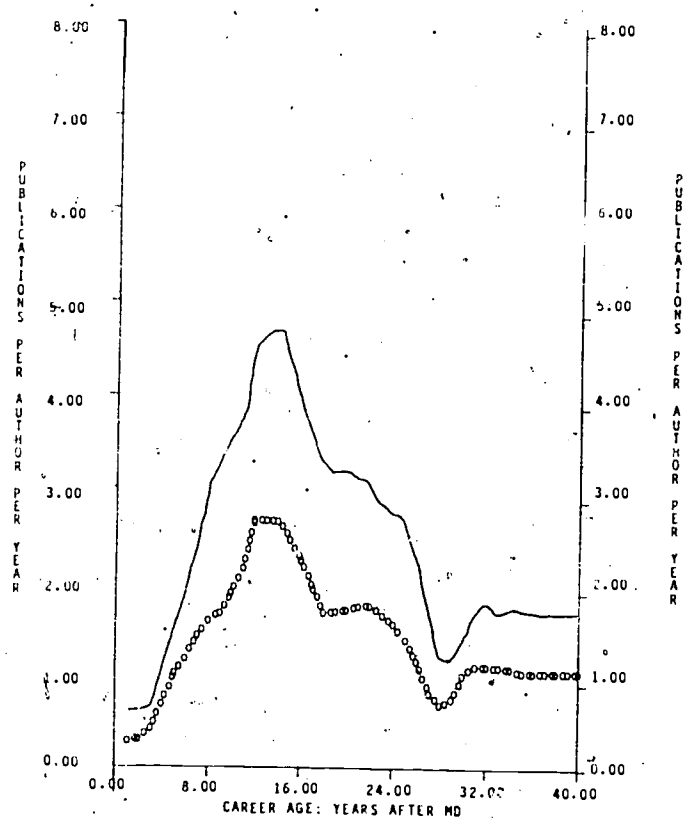


CAREER AGE	COMPOSITE PUBL RATE	SPECIAL RATE
1	.175	.075
2	.300	.183
3	.483	.267
4	.867	.517
5	1.150	.629
6	1.412	.742
7	1.719	.859
8	2.140	1.070
9	2.670	1.403
10	2.833	1.463
11	2.987	1.569
12	2.940	1.478
13	2.955	1.365
14	3.384	1.456
15	3.585	1.555
16	3.987	1.877
17	3.690	1.788
18	3.674	1.825
19	3.579	1.877
20	3.922	1.842
21	4.264	1.860
22	4.016	1.563
23	3.664	1.591
24	3.300	1.618
25	3.322	1.410
26	3.039	1.187
27	2.867	.950
28	2.417	.933
29	2.181	.859
30	1.884	.666
31	1.906	.783
32	1.803	.797
33	1.784	.773
34	1.718	.659
35	1.500	.600
36	1.400	.550
37	1.300	.500
38	1.200	.450
39	1.100	.400
40	1.000	.350

KEY

Upper line: all articles, books, etc.
Lower line: articles in special journal subset.

Exhibit II.56 MDs IN BASIC SCIENCES, GRADS FROM 1944-72



CAREER AGE	COMPOSITE PUBL RATE	SPECIAL RATE
1	.667	.310
2	.651	.333
3	.698	.460
4	1.143	.746
5	1.600	1.065
6	2.016	1.242
7	2.484	1.489
8	3.061	1.668
9	3.352	1.724
10	3.585	1.930
11	3.890	2.232
12	4.594	2.752
13	4.855	2.751
14	4.863	2.652
15	4.305	2.387
16	3.974	2.178
17	3.496	1.881
18	3.331	1.628
19	3.395	1.690
20	3.292	1.704
21	3.229	1.765
22	3.055	1.736
23	2.913	1.612
24	2.856	1.516
25	2.460	1.326
26	1.964	1.103
27	1.317	.767
28	1.267	.650
29	1.565	.783
30	1.859	1.065
31	2.004	1.137
32	1.789	1.109
33	1.952	1.078
34	1.825	1.058
35	1.800	1.000
36	1.800	1.000
37	1.800	1.000
38	1.800	1.000
39	1.800	1.000
40	1.800	1.000

KEY

Upper line: all articles, books, etc.
Lower line: articles in special journal subset.

Exhibit II.57

MD FACULTY ACTIVATION AND DEACTIVATION RATES USED IN PROJECTIONS OF NUMBERS OF RESEARCH PUBLICATIONS

Career Age (Years after MD)	Approximate Chronological Age	A Age Distribution (percent)*	B Deactivation Rate (percent)**
0	25	.26	.00
1	26	.19	.00
2	27	.40	3.70
3	28	2.63	7.43
4	29	6.69	9.54
5	30	10.02	10.76
6	31	10.14	9.94
7	32	10.28	8.25
8	33	9.32	9.12
9	34	6.02	8.65
10	35	4.96	8.11
11	36	4.57	6.70
12	37	4.11	6.21
13	38	3.05	6.35
14	39	2.61	4.98
15	40	2.46	4.94
16	41	2.33	4.57
17	42	2.19	4.69
18	43	2.15	3.95
19	44	1.87	3.89
20	45	1.88	2.66
21	46	1.27	3.47
22	47	1.77	3.42
23	48	1.20	3.75
24	49	1.45	3.32
25	50	1.10	3.46
26	51	.75	2.55
27	52	.84	3.43
28	53	.76	3.63
29	54	.61	2.23
30	55	.47	3.47
31	56	.57	3.65
32	57	.53	3.12
33	58	.50	3.56
34	59	.48	3.76
35	60	.39	2.93
36	61	.25	3.73
37	62	.23	3.25
38	63	.20	6.85
39	64	.15	8.02
40	65	.12	10.59
41 and over	66 and over	.00	25.00

* May not sum to 100.00 due to rounding. For definition see text.
** For definitions, see text.

ages over 41; that is, an average chronological age of 66 and over. For these ages, our model assumes there will be no first-time accessions to the faculty. The sum of the career age activation percentages in column A is 100.0.

3. Deactivation Rates. Column B of Exhibit II.37 presents the rates of deactivation for MD faculty at each career age. For example, 8.11 percent of MD faculty with a career age of 10 (chronological age about 35) will leave the roster of faculty each year. These rates are the averages of the rates for 1976, 1977 and 1978. The rate for career ages of 41 and over, that is, those with an average chronological age of 66 and over, has been arbitrarily adjusted upward from 10.62 percent to 25 percent to account for increasing pressure to retire soon after the age of 65

4. Faculty Growth Rate. Three different assumptions were made about future growth in the size of U.S. medical school faculties. The assumed rates are six percent growth (a continuation of the trend over the past five years), three percent growth and no growth. These are the same values used in previous National Research Council "demand" models.

5. Estimation of Future Publications. Beginning with the faculty age distribution in 1978 (latest complete data), the number of faculty at each age career in 1979 was estimated by adjusting the distribution for deactivations, for aging by one year, and for accessions. The number of accessions was equal to the number of deactivations plus the growth rate times the size of the faculty in the previous year. Thus, the number of faculty at each career age in 1979 was derived. The expected rate of publication by faculty at each career age was multiplied by the number of faculty at that career age and the results were summed over all ages,

resulting in an estimation of number of publications by U.S. medical school faculties in 1979. The process was iterated from 1978 through 1990. (The projected number of MD faculty replaced and added in each successive year are presented below in section J of this chapter.)

6. Results of Projected Publication Output. In the preceding sections of this chapter we have developed a faculty sampling frame, measures of research productivity (including all publications and selected research publications), creation of productivity profiles by physician speciality group and estimates of MD faculty age distribution between 1968 and 1990. In this section, we present estimates of the research productivity of physician scientists by combining all preceding technical steps to obtain projected publication output of physician faculty over the decade 1980-1990. All the caveats previously cited apply to these estimates but it is especially important to keep in mind that the projected publication rates will appear artificially high because each actual publication has an average of three co-authors. (To estimate the true number of publications annually, therefore, divide by three.) The total number of publications should be interpreted cautiously. However, the trends in publication rates, annual as well as long term percentage changes and differences between specialty groups are valid within the limits of the methodology employed. Complete publication projections for all specialty groups as well as projections of faculty size are given in Appendix II.5. Summary results for the years 1980, 1985, and 1990 are given in this chapter as Exhibits II.58 through II.62.

The first three Exhibits summarize the results of projected publication output for all publications and for selected research publications employing three assumptions about faculty growth: 1) six percent faculty growth, 2) three percent faculty growth and 3) zero faculty growth. A six percent

faculty growth rate (Exhibit II.58) projects a continuation of the recent trend in growth of U.S. medical schools throughout the decade 1980-90. Under these assumptions all publications by MD faculty will increase 95.2 percent from 70,661 to 137,961 publications per year. (In Exhibits II.58 through II.62 and in the text, percent changes in annual numbers of publications are based on 1978 as the base year.) At a six percent physician faculty growth rate by 1990 "selected research" publications will also increase 95.0 percent from 29,528 to 57,570 publications per year.

At a three percent MD faculty growth rate, a rate one half present growth, annual publications will grow by 37.0 percent reaching 96,785 publications in 1990 (Exhibit II.59). At the three percent faculty growth rate selected research productivity will increase by 35.5 percent to 39,995 publications. If steady-state conditions apply with zero growth of faculty and replacement of retirees and other losses to the faculty only (Exhibit II.60), all publications will decline 5.8 percent from the 1978 level to 66,549 and selected research productivity will decrease 8.1 percent to 27,132 research publications by 1990.

In the three examples given above, the magnitude of change (either growth or decrease) varies among physician specialty groups. For example, in the zero faculty growth state with a 8.1 percent overall decrease in selected research publications, comparable publications by the medical specialties will decrease only 3.3 percent due chiefly to the characteristics of the productivity profile for that specialty group. Comparable values for the surgical specialties are an 18.9 percent decline in annual output, and a 15.0 percent decrease in ouput by the physicians in basic sciences. It should be noted that there is a small variance in the annual rate of change

EXHIBIT II:58

PROJECTED PUBLICATION OUTPUT BY PHYSICIAN SPECIALTY GROUPS

BASED ON SIX PERCENT ANNUAL FACULTY GROWTH

	1980		1985		1990	
All Publications	Number	Percent Change*	Number	Percent Change	Number	Percent Change
Medical Specialties	39,824	11.7	52,794	48.1	70,777	98.5
Surgical Specialties	14,610	10.4	18,929	43.0	25,028	89.0
Behavioral Specialty	4,666	11.7	6,189	48.2	8,280	98.3
Hospital-Based Specialties	15,146	11.1	19,724	44.7	26,157	91.9
Basic Sciences	4,388	10.5	5,759	45.1	7,719	94.4
Total	78,635	11.3	103,399	46.3	137,961	95.2
Select Research Publications						
Medical Specialties	19,576	11.6	25,838	47.2	34,560	96.9
Surgical Specialties	3,205	10.2	4,166	43.3	5,532	90.3
Behavioral Specialty	729	10.8	955	45.1	1,292	96.2
Hospital-Based Specialties	6,902	10.8	8,982	44.2	11,930	91.5
Basic Sciences	2,414	10.5	3,173	45.3	4,256	94.9
Total	32,826	11.2	43,114	46.0	57,570	95.0

* Change from 1978 base year.

EXHIBIT II.59

PROJECTED PUBLICATION OUTPUT BY PHYSICIAN SPECIALTY GROUPS

BASED ON THREE PERCENT ANNUAL FACULTY GROWTH

	1980		1985		1990	
All Publications	Number	Percent Change *	Number	Percent Change	Number	Percent Change
Medical Specialties	37,977	6.5	43,606	22.3	50,453	41.5
Surgical Specialties	13,900	5.0	15,451	16.7	17,194	29.9
Behavioral Specialty	4,440	6.3	5,078	21.6	5,843	39.9
Hospital-Based Specialties	14,381	5.5	16,067	17.9	18,096	32.8
Basic Sciences	4,133	4.1	4,572	15.2	5,199	31.0
Total	74,831	5.9	84,774	20.0	96,785	37.0
Select Research Publications						
Medical Specialties	18,650	6.3	21,239	21.0	24,414	39.1
Surgical Specialties	3,017	3.8	3,313	14.0	3,694	27.1
Behavioral Specialty	690	4.9	765	16.2	876	33.1
Hospital-Based Specialties	6,532	4.9	7,245	16.3	8,147	30.8
Basic Sciences	2,271	4.0	2,515	15.1	2,864	31.1
Total	31,162	5.5	35,077	18.8	39,995	35.5

* Change from 1978 base year.

EXHIBIT II.60

PROJECTED PUBLICATION OUTPUT BY PHYSICIAN SPECIALTY GROUPS

BASED ON ZERO PERCENT ANNUAL FACULTY GROWTH

	1980		1985		1990	
All Publications	Number	Percent Change*	Number	Percent Change	Number	Percent Change
Medical Specialties	36,181	1.5	35,810	-.5	35,522	-.4
Surgical Specialties	13,210	-.2	12,502	-5.6	11,415	-13.8
Behavioral Specialty	4,221	1.1	4,136	-1.0	4,056	-2.9
Hospital-Based Specialties	13,636	.1	12,975	-4.8	12,185	-10.6
Basic Sciences	3,885	-2.1	3,570	-10.1	3,371	-15.1
Total	71,133	.7	68,993	-2.4	66,549	-5.8
Select Research Publications						
Medical Specialties	17,750	1.1	17,339	-1.2	16,964	-3.3
Surgical Specialties	2,835	-2.5	2,595	-10.8	2,357	-18.9
Behavioral Specialty	653	-.9	603	-8.3	573	-13.0
Hospital-Based Specialties	6,172	-.9	5,779	-7.2	5,383	-13.6
Basic Sciences	2,133	-2.3	1,959	-10.3	1,855	-15.0
Total	29,543	.1	28,275	-4.2	27,132	-8.1

* Change from 1978 base year.

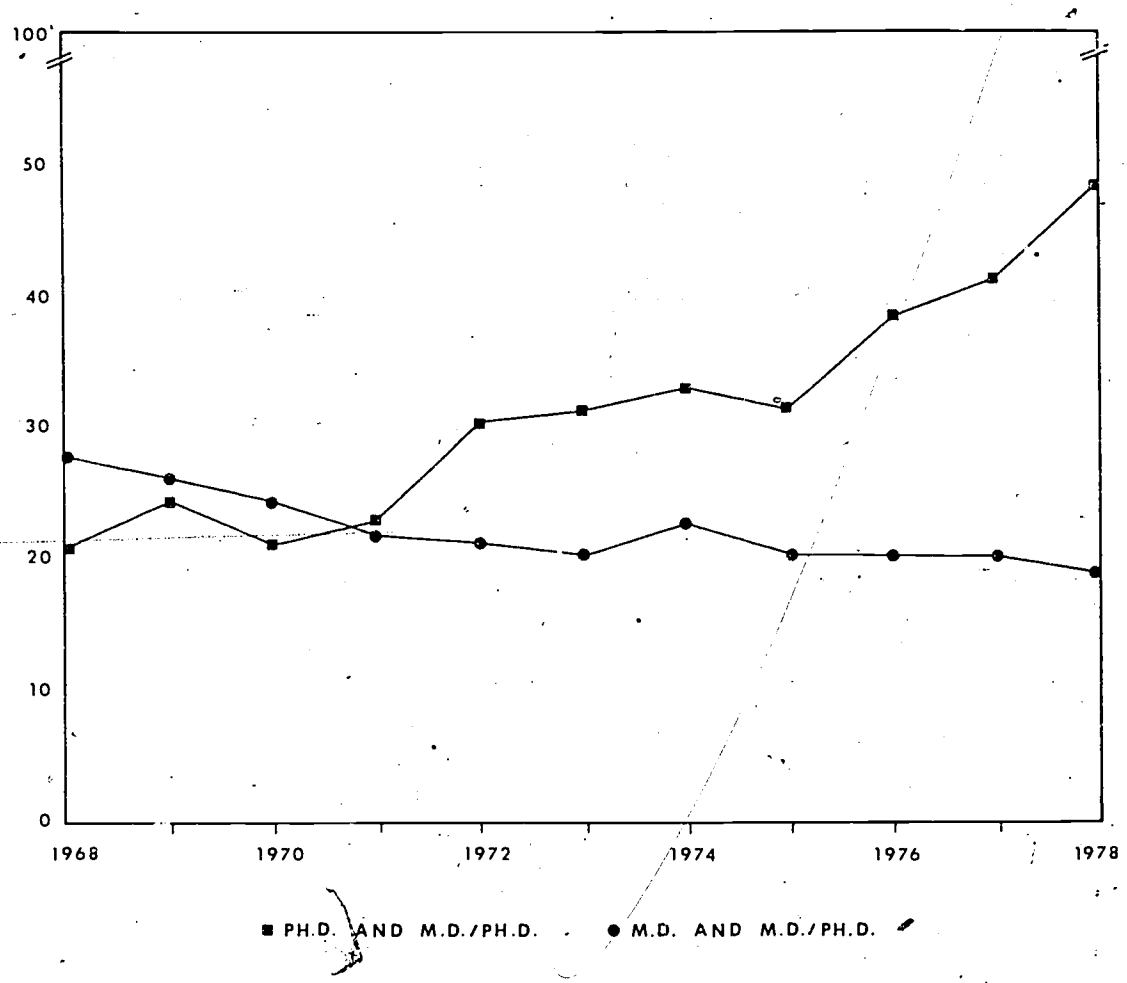
of publication output due to the combination of aging of the faculty and differences in productivity profiles among specialties. For details of the latter changes Appendix II.6 should be consulted.

In the previous three examples with growth rates of six, three and zero percent, we implicity assumed that all new physicians recruited to the faculty will have the same amount of research training (and, presumably, research productivity) as those physicians currently on medical school faculties. It may be instructive to modify the present model, and adjust it to account for the diminished levels of research training received by new young faculty. Of present faculty, 87.3 percent received their MD degrees between 1944 and 1972 and 32.25 percent had identifiable research training before becoming faculty members (Exhibits II.1 and II.6). However, since 1974 there has been a sharp decline in the number of physicians seeking research training.* Data have been developed very recently at the AAMC about new faculty hires in the period 1968 to 1978, the latest faculty cohort reported in the present study. Dr. H. Paul Jolly and his colleagues have shown (Exhibit II.61) that only 20.15 percent of the MD and MD-PhD faculty hires in the years 1975-1978 have had any identifiable research training. Therefore, we may assume that 12.1 percent (32.25 minus 20.15) fewer faculty prepared for research careers will be hired in the near future. To maintain zero faculty growth, about 5.13 percent of MD faculty must be replaced annually (the average deactivation rate over the four years, 1975, to 1978). The very recent decrease in research career preparation for physicians means that even with no faculty growth, a condition likely to prevail in the near future at many medical schools, there is likely to be a 0.62 percent decrease in faculty research

* Wyngaarden, J.G. The Clinical Investigator as an Endangered Species. New England Journal of Medicine, 301: 1254-59 (1979)

EXHIBIT II.61

PERCENT DISTRIBUTION OF FULL-TIME NEW HIRES WITH RESEARCH TRAINING *



Source: Jolly, H.P., Higgins, E.J., Goodson, M.P., Trends In Medical School Faculty Characteristics New Faculty And Continuing Faculty 1968-1978, AAMC, Washington, D.C., 1980, p 56.

productivity.* Exhibit II.62 displays the effect of these assumptions on faculty research productivity at zero growth or steady-state. In this example, by 1990 all publications by physician faculty will decrease 13.1 percent from 70,661 to 61,402 annually and "select research" publications will decrease 15.5 percent from 29,528 to 24,947. The decline in research output by physicians will be especially severe in the basic sciences with a decrease of 22.8 percent and in the surgical specialties where total output will decline 21.3 percent and "select research" output will decline 26.7 percent.

J. Comparison of AAMC Model with NRC "Demand" Model

In its 1978 report, the Committee on a Study of National Needs for Biomedical and Behavioral Personnel at the National Research Council (NRC) published estimates of the numbers of new clinical faculty that will be needed annually to maintain a gradually increasing ratio of clinical faculty to medical students. The NRC "demand" model further incorporated varying estimates of growth in numbers of medical students and changes in Research and Development (R&D) expenditures and medical service income. The model assumed that 1.3 percent of clinical faculty would be replaced annually due to death and retirement.

The model presented in this chapter differs from the NRC model in several significant ways. The AAMC model makes no assumption about faculty/student ratios, R&D expenditure or medical practice income. The AAMC model projects faculty replacements based on observed age-dependent rates of loss and hiring

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* 5.13 percent faculty replacement rate times 12.1 percent less research training.

EXHIBIT II.62

PROJECTED PUBLICATION OUTPUT BY PHYSICIAN SPECIALTY GROUPS

BASED ON 0.7 PERCENT ANNUAL FACULTY DECREASE

	1980		1985		1990	
All Publications	Number	Percent Change*	Number	Percent Change	Number	Percent Change
Medical Specialties	35,816	.5	34,356	-3.6	32,980	-7.5
Surgical Specialties	13,570	-1.3	11,951	-9.7	10,428	-21.2
Behavioral Specialty	4,176	0.0	3,961	-5.2	3,752	-10.2
Hospital-Based Specialties	13,485	-1.1	12,399	-9.0	11,179	-18.0
Basic Sciences	3,835	-3.4	3,384	-14.7	3,063	-22.8
Total	79,382	-.4	66,051	-6.5	61,402	-13.1
Select Research Publications						
Medical Specialties	17,567	.1	16,612	-5.3	15,696	-10.6
Surgical Specialties	2,798	-3.8	2,461	-15.3	2,130	-26.7
Behavioral Specialty	645	-2.0	573	-12.9	521	-20.8
Hospital-Based Specialties	6,099	-2.1	5,506	-11.6	4,914	-21.1
Basic Sciences	2,105	-3.6	1,856	-15.0	1,685	-22.8
Total	29,214	-1.1	27,008	-8.5	24,947	-15.5

* Change from 1978 base year.

and varying assumptions of overall rates of growth. The AAMC model estimates numbers of MD faculty in all departments (including basic sciences) but excludes faculty with "clinical" appointments and ranks below "assistant professor" (i.e., instructors). While it is not a specific parameter of the AAMC model, the rate of annual loss from the faculty due to death, retirement and all other reasons (e.g., leaving academic medicine for private practice) was about 5.13 percent. Finally, the AAMC model assessed the anticipated effects on research output based on observed specialty-and age-dependent rates of faculty productivity.

Given these very different asssumptions and definitions, it is not surprising that the resulting estimates of the two models would appear to differ. At an assumed three percent annual growth in numbers of medical students and seven percent annual expansion in funds available for research (values in the middle of the two ranges), the NRC model projects that in 1983 there would be 38,121 clinical faculty, a growth rate of 4.2 percent annually, an increment of 1,360 positions per year, replacement of 434 faculty losses due to death and returement, thus a need for 1,794 new members of the clinical faculties annually. At an assumed three percent annual growth in MD faculty, the AAMC model projects that in 1983, 1,478 new MD faculty will be needed for replacement and 805 will be needed for growth resulting in 2,283 new MD faculty members among a total of 27,630 at year's end. The year-to-year projections by the AAMC model are presented in Exhibit II.63. The AAMC estimates show a greater need for new faculty than does the NRC model, though the <u>total</u> number of physicians is smaller in the AAMC model. This would be true even if the AAMC estimates were increased by 15 percent to account for instructors, who are otherwise omitted. The remaining difference may be due to faculty with clinical appointments that are excluded from AAMC counts because they are less likely to be active research investigators.

EXHIBIT II.63

PROJECTED ANNUAL NEED FOR MD FACULTY* FOR THE YEARS 1978 THROUGH 1990
ASSUMING ZERO PERCENT, THREE PERCENT, AND SIX PERCENT GROWTH IN FACULTY

Calendar Year	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990
Zero Percent Growth													
Number of Faculty in January	23140	23140	23140	23140	23140	23140	23140	23140	23140	23140	23140	23140	23140
Number Needed for Replacement	1303	1273	1247	1236	1230	1229	1248	1254	1266	1273	1276	1284	1293
Number Needed for Growth	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Need	1303	1273	1247	1236	1230	1229	1248	1254	1266	1273	1276	1284	1293
Three Percent Growth													
Number of Faculty in January	23140	23834	24549	25286	26044	26826	27630	28459	29313	30192	31098	32031	32992
Number Needed for Replacement	1303	1324	1348	1387	1430	1478	1545	1600	1660	1716	1768	1826	1887
Number Needed for Growth	694	715	736	759	781	805	829	854	879	906	933	961	990
Total Need	1997	2039	2085	2146	2212	2283	2374	2454	2539	2632	2701	2787	2876
Six Percent Growth													
Number of Faculty in January	23140	24528	26000	27560	29214	30967	32825	34794	36882	39095	41440	43927	46562
Number Needed for Replacement	1303	1375	1453	1548	1650	1760	1892	2016	2149	2283	2419	2566	2721
Number Needed for Growth	1388	1472	1560	1654	1753	1858	1969	2088	2213	2346	2486	2636	2794
Total Need	2691	2846	3013	3202	3403	3618	3861	4103	4361	4628	4905	5201	5515

* Faculty counts include full-time and volunteer MD faculty having regular appointments in ranks of assistant, associate and full professor. Clinical appointments and instructor ranks were excluded.

The AAMC model also shows the effects of faculty growth and aging on research output by the total faculty and by several groups of specialties. Given age-specific rates of productivity in the several specialty groups, the AAMC model anticipates an annual increase of 2.6 percent in research output, as measured by research publications, if the MD faculty grows at three percent through 1983 (Appendix II.6.2)

Both the NRC and AAMC models have their merits. Their differences are principally in their definitions and assumptions. It may be useful to combine the two methods for improved prognostications.

APPENDICES

II.1 - II.6.4

APPENDIX II.1

610 QUESTIONNAIRES RETURNED THAT ARE USEABLE
546 RESUMES RECEIVED
89.0 PERCENT OF RESPONDENTS ENCLOSED RESUMES

NB: Row and column designations correspond to those shown in Exhibit II.3

NUMBER OF RESPONDENTS IN EACH CELL:

25	19	29	28	30
26	22	23	26	23
25	23	21	26	27
22	24	29	22	22
23	24	26	22	23

NUMBER OF RESUMES IN EACH CELL:

20	18	25	28	27
22	20	20	22	22
21	21	17	25	21
20	17	29	21	19
20	22	26	22	21

NUMBER OF SUCCESSFUL MAILINGS IN EACH CELL

36	38	41	40	40
39	39	39	37	39
40	39	38	40	39
40	40	40	40	39
41	40	39	40	40

CELL RESPONSE RATE:

69.44	50.00	70.73	70.00	75.00
66.67	56.41	58.97	70.27	58.97
62.50	58.97	55.26	65.00	69.23
55.00	60.00	72.50	55.00	56.41
56.10	60.00	66.67	55.00	57.50

RESUME RATE:

80.00	94.74	86.21	100.00	90.00
84.62	90.91	86.96	84.62	95.65
84.00	91.30	80.95	96.15	77.78
90.91	70.83	100.00	95.45	86.36
86.96	91.67	100.00	100.00	91.30

APPENDIX II.2

Assessment of Response Bias in Survey of Academic Physicians and Comparison of Several Measures of Faculty Research Involvement

A research productivity study being conducted by the AAMC for the National Academy of Sciences includes an analysis of the curriculum vitae (CVs) of academic physicians drawn from the Faculty Roster System (FRS).[1] To test for a possible bias between returned and non-returned requests, a proxy of known research involvement is needed for each member of the entire sample. The two proxies here under consideration are the Major Responsibility Code for research (from the Faculty Roster) and "RESIN," an index of RESearch INvolvement calculated from Major Responsibilty Codes by the formula derived by William E. Rhode, Ph.D.[2] Before being used in an analysis of possible response bias, the validity of each measure is examined. This analysis was performed when 96 percent of the final returns were in.

DATA

There are five Major Responsibility Codes on each faculty member's FRS record. For each of five academic activities, teaching (T), practice (P), research (R), administration (A) and "other" (O) there is one coded level of involvement: "2" means it is the primary area of responsibility; "1" means at least 10% of time is spent in the activity, "0" means less than 10% of time is devoted to the activity. A copy of the FRS reporting forms are appended to this memorandum (Appendix A). The Major Responsibility Code (either 0, 1, or 2) for the research category is used here as one proxy for resarch involvement and is abbreviated "MJRCD." Rhode's index, "RESIN," is equal to MJRCD divided by the sum of all five Major Responsibility Codes. "RESIN" has nine possible values ranging from zero to 100.[3]

To test these two measures, we compared each with the total hours spent on research and the percent of total work-week hours spent on research as reported by the academic physicians in a questionnaire which accompanied the request for the CV. A copy of the questionnaire is shown as Exhibit II.2.

In addition to their research involvement, respondents and non-respondents are compared on age, rank, and whether they also hold a Ph.D degree.

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[1] Forty full-time paid and volunteer MD faculty with regular (non-clinical) rank of Assistant-, Associate-, or Full Professor were sampled randomly from each of 25 stratification cells defined jointly by five classes of academic departments (medicine, surgery, psychiatry, hospital-based specialty, and basic science) and five MD graduation eras (1944-52, 1953-57, 1958-62, 1963-67, and 1968-72).

[2] Postdoctoral Awards and Medical School Faculty Research; Resources Analysis Memo No. 18; Division of Resources Analysis, Office of the Associate Director for Program Planning and Evaluation, NIH, July, 1977.

[3] The possible values are: 0, 16.67, 20.00, 25.00, 33.33, 40.00, 50.00, 66.67, 100.00

RESULTS

(1) Major Responsibility Code (MJRCD). The following table presents the means and standard deviations of self-reported time spent in research, both in hours and percent of work week (for 586 faculty who responded to our survey) with each of three possible FRS codes of research involvement:

"MJRCD" Faculty Roster Code of Research Responsibility	Number of Faculty	Hours-per-week spent in research		Percent of week spent in research	
		mean	s.d.	mean	s.d.
0 : none or less than 10%	141	10.1	11.5	18.6	22.2
1 : more than 10%	401	21.8	16.5	38.3	28.8
2 : primary activity	44	37.5	15.6	67.3	26.5
Tests of overall difference among three categories based on data from 586 survey respondents		$F = 60.3$ $df = 2 \& 583$ $p < .0001$		$F = 59.5$ $df = 2 \& 583$ $p < .0001$	

There is an imperfect correspondence between MJRCD and either survey-reported time or percent of time in research. The data do show higher mean research time corresponding with higher MJRCD codes. The mean differences are also statistically significant. There is, nevertheless, considerable overlap in the distribution of "hours" and "percent" as demonstrated in the SPSS scatterplot labelled Exhibit 1. The values within a range of one standard deviation from the mean are highlighted in a "box."

(2) Rhode's Research Involvement Index (RESIN).

RESIN was developed to provide a nearly-as-possible continuous measure of research involvement for the purpose of product-moment correlation and regression with other variables. The correlations of current interest are found to be:

CORRELATIONS WITH "RESIN"

	Hours-per-week spent in research	Percent of Week spent in research
Based on data for 586 MD faculty from all departments	$r = .52$ $r^2 = .27$	$r = .53$ $r^2 = .28$

The square of r indicates the percentage of variation in each variable "explained" by RESIN. Clearly there is much residual variation to be explained. The correlation is better demonstrated by the SPSS scatterplot, Exhibit 2.

Exhibit 1

Distributions of "Percent of Work Week in Research" For Each of Three Possible "Major Responsibility Codes" for "Research"

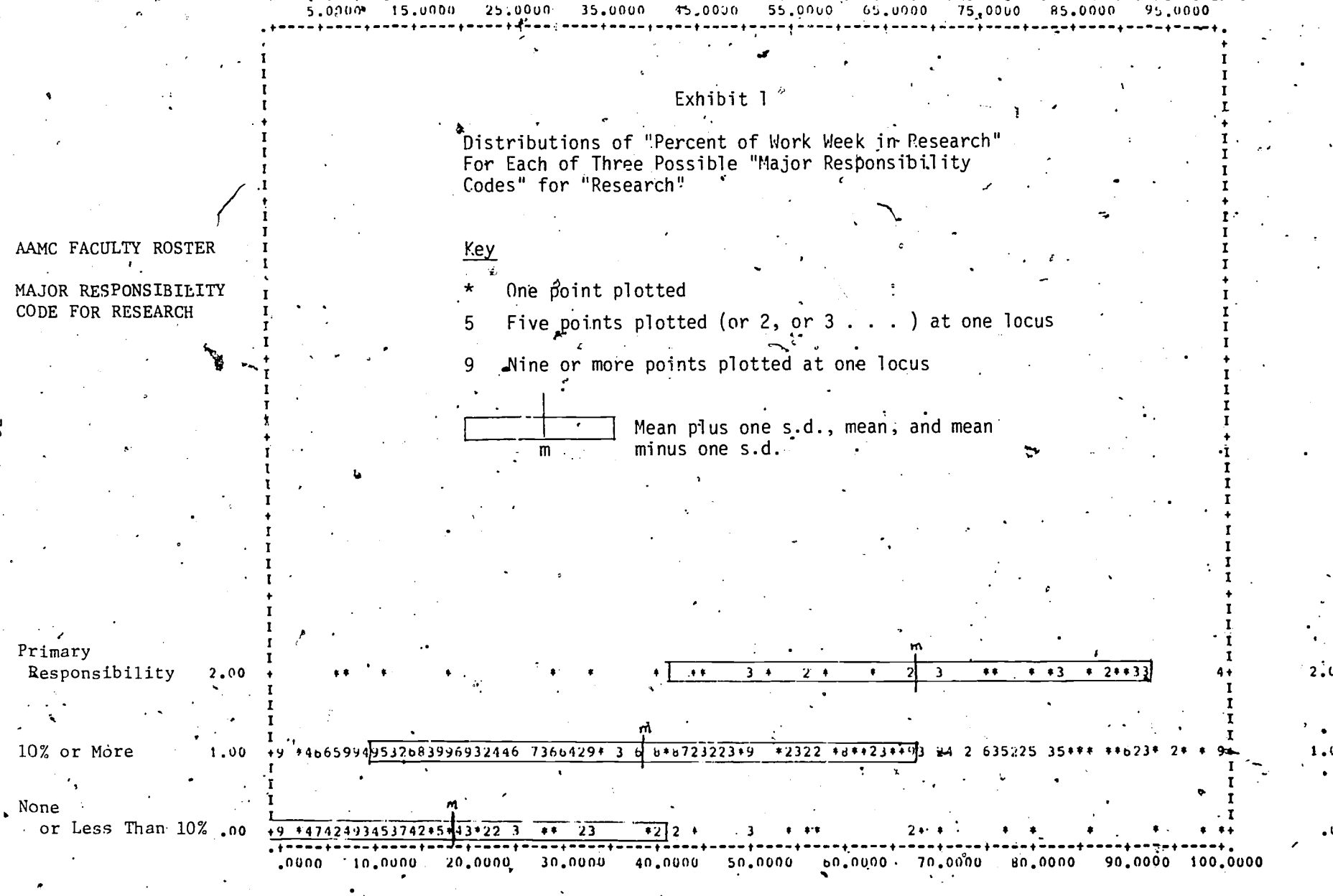
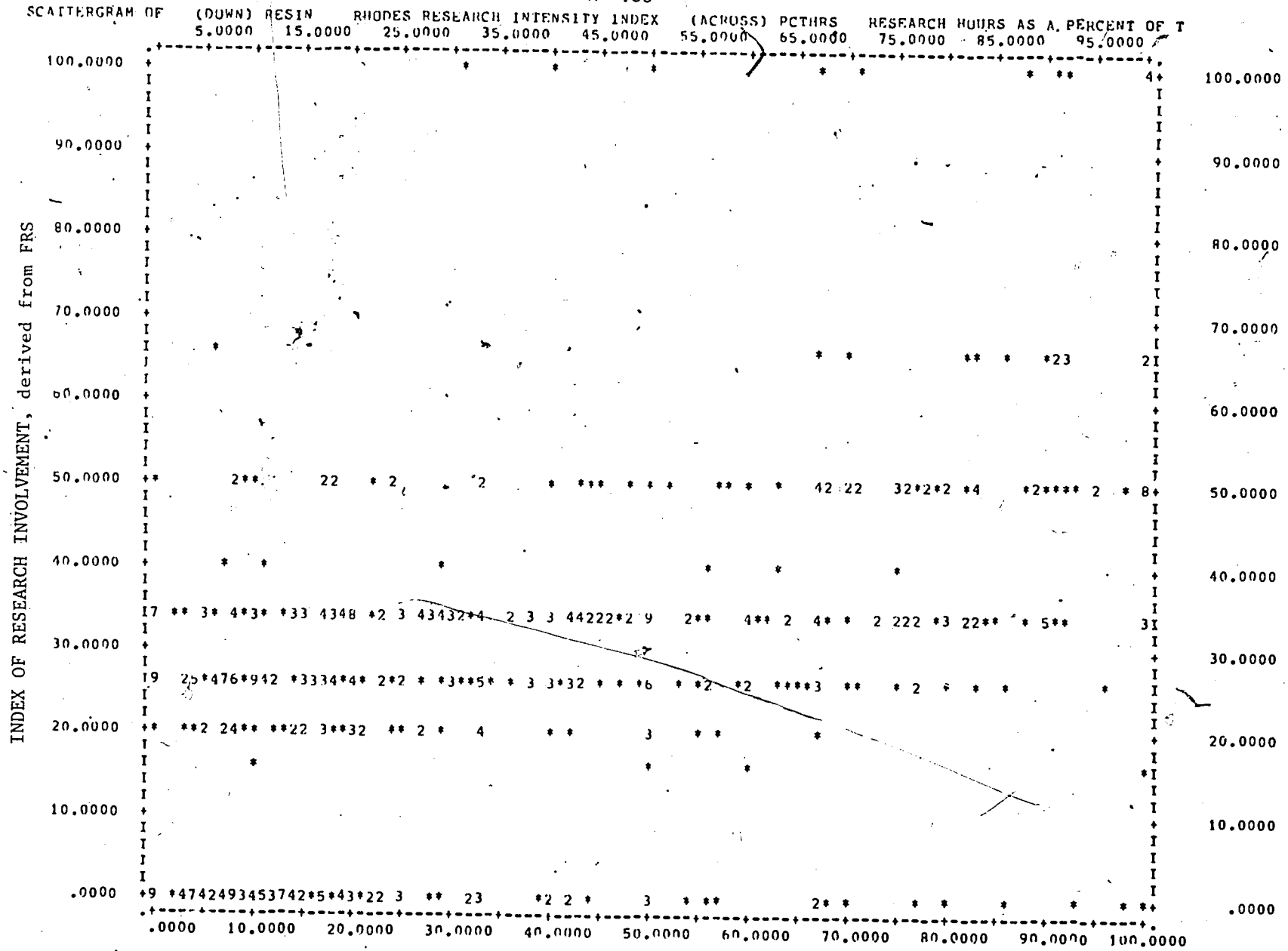


Exhibit 2

Correlation Between "RESIN" and "PERCENT OF HOURS"

R= .53



As demonstrated in the next table, RESIN seems to be a better indicator of research involvement for MD faculty in basic science departments than for MD faculty in clinical departments. None of the correlations, however, is particularly strong.

CORRELATIONS WITH "RESIN"

DEPARTMENTS	Hours-per-week spent in research		Percent of week spent in research	
	r	r^2	r	r^2
MEDICINE N = 125	.45	.21	.49	.24
SURGERY N = 115	.33	.11	.39	.15
PSYCHIATRY N = 117	.44	.19	.45	.21
HOSPITAL - BASED N = 112	.41	.17	.42	.18
BASIC SCIENCE N = 111	.56	.32	.53	.28

Because of its derivation, RESIN can assume only nine different values. The following table presents the means of hours-per-week in research and percent-of-week in research reported by individuals having each of the nine possible values of RESIN:

RESIN:	Number of Faculty	Hours-per-week spent in research		Percent of week spent in research	
		mean	s.d.	mean	s.d.
0.0	141	10.1	11.5	18.6	22.1
16.7	4	26.0	15.4	55.0	37.0
20.0	46	13.8	10.8	22.4	16.2
25.0	133	16.7	14.4	28.1	23.5
33.3	161	22.8	15.5	40.7	26.9
40.0	6	27.5	20.2	40.0	28.4
50.0	69	35.5	16.5	64.8	28.8
66.7	14	45.0	13.8	81.5	23.7
100.0	12	42.3	14.6	77.5	25.2
Tests of overall differences among eight categories based on data from 586 survey respondents:		F = 31.1 df = 8 & 577 p < .0001		F = 35.6 df = 8 & 577 p < .0001	

Exhibit 3 is the same as Exhibit 2 but also shows the means and standard deviations of "percent-of-week" for each value of RESIN shared by ten or more faculty respondents. The relationship between RESIN and "percent-of-week" is fairly linear in the middle range. The curve at the low end may be due in part to the fact that our definition of hours-in-research includes all research activities, even those overlapping with patient care, teaching and administration. The FRS definition may be implicitly less inclusive. The reversal observed in the plot at the high end may be due to incomplete Faculty Roster record updating. As time passes, a faculty member may become less involved in research, but his FRS record may not be updated until he changes rank or institutions. Even at that time, this item may be overlooked resulting in faculty who are less involved in research than their FRS codes indicate.

When we examine the data for MDs in basic science departments only, the correspondence between RESIN and mean "percent-of-week or "hours-per-week" is monotonicly increasing, that is, the "curve" corresponding to that in Exhibit 2 (not shown) does not "turn back." This "better" relationship is also reflected in the higher correlation coefficients for basic science departments, presented above.

Clearly both, RESIN and MJRCD are less than perfect proxies for current level of research involvement. This should be kept in mind when we compare these variables for respondents and non-respondents.

(3) Respondents versus Non-respondents.

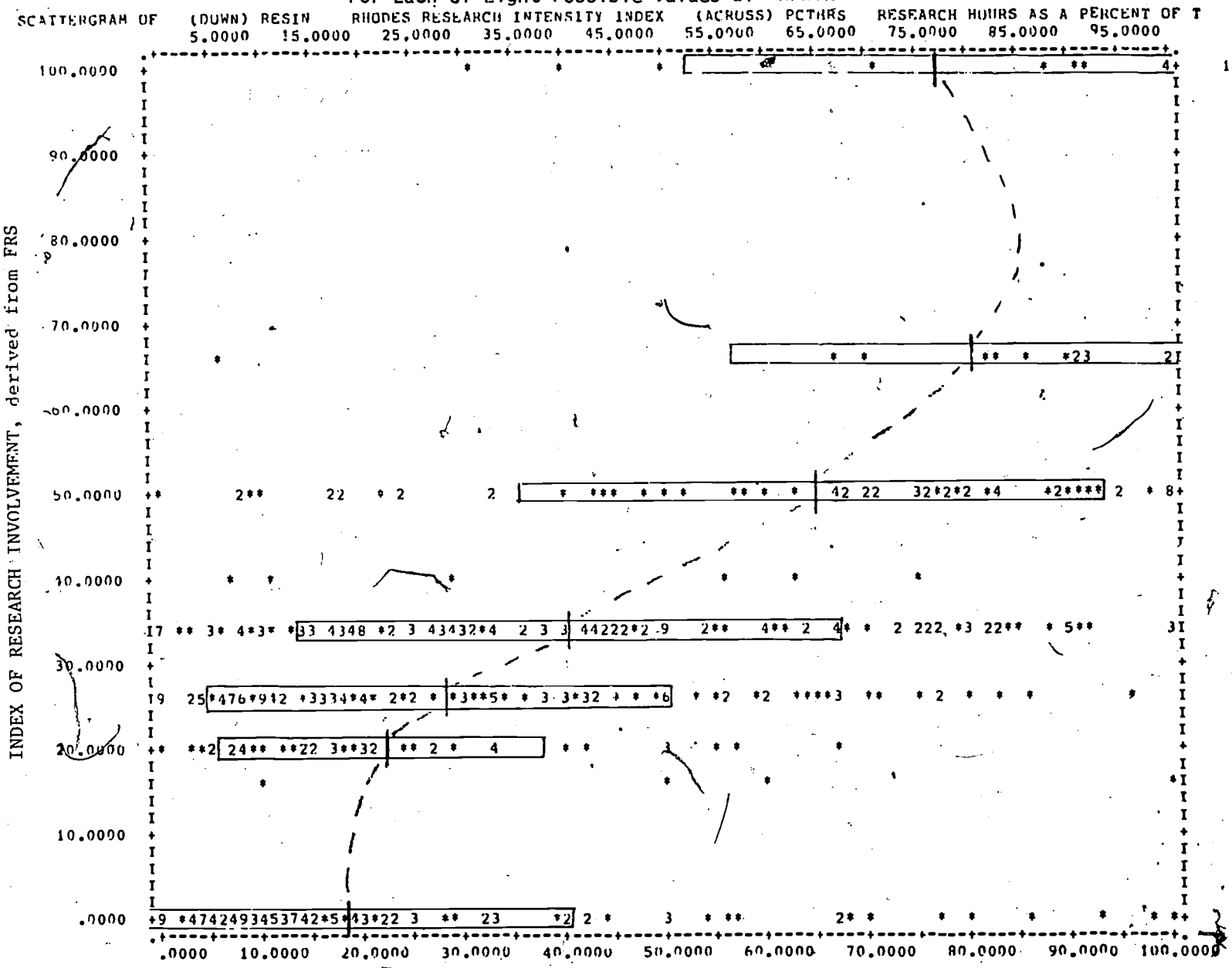
Questionnaires with requests for CVs were eventually mailed to 1041 people named by the Faculty Roster and selected by our sampling procedure. Of these, 57 were returned with an indication that the named physician was not a valid member of the defined survey population, e.g., was dead or no longer on the faculty. Of the remaining 984 physicians, 609 (61.6 percent) responded to our survey. Are the 609 respondents similar to the 375 faculty who did not respond with respect to their level of research effort and other characteristics that could affect or be influenced by their research productivity?

(a) MJRCD. The following table shows the numbers of respondents and non-respondents having each of the three FRS codes of research activity: (Numbers in parenthesis indicate row percentages.)

"MJRCP" Faculty Roster Code of Research Responsibility	Non-Respondents	Respondents	Row Total
0 : none or less than 10%	130 (47.8%)	142 (52.2%)	272 (100.0%)
1 : more than 10%	212 (34.6%)	401 (65.4%)	613 (100.0%)
2 : primary activity	12 (21.4%)	44 (78.6%)	56 (100.0%)
Col. Total	354 (37.6%)	587 (62.4)	941 (100.0%)

Exhibit 3

Means and Standard Deviations of "Percent of Work Week Spent in Research"
For Each of Eight Possible Values of "RESIN"



Major Responsibility Codes were not available for the remaining 43 of the 984 sampled faculty. It appears that faculty with more research responsibility were more likely to respond to our survey. This observation is statistically significant (Chi-square = 20.7, with 2 degrees of freedom, $p < .0001$).

(b) RESIN - Respondents to our survey had a higher average value of the derived research involvement index than had non-respondents.

		RESIN	
	n	mean	s.d.
Respondents	587	26.4	20.1
Non-respondents	354	23.1	22.3

The difference is statistically significant ($F = 5.6$, d.f. = 1 & 939, $p < .02$). It was also observed that this pattern of respondents having higher average RESIN values than non-respondents was generally true for clinical departments (17 out of 20 sampling cells) and the opposite was true for basic science departments in all five sampling "eras." For basic science departments, respondents had a lower average RESIN value than non-respondents.

(c) Age. Our sample was stratified by year of graduation from medical school, so it is not surprising that the average age of respondents (46.1 years) is not statistically different from the average age of non-respondents (45.5 years). ($F = 1.31$, d.f. = 1 & 982, $p < .28$).

(d) Academic Rank. Faculty from the higher academic ranks were more likely to respond to our survey, as is shown in the following table:

Academic Rank	Non-Respondents	Respondents	Row Total
Full Professor	109 (30.2%)	252 (69.8%)	361 (100.0%)
Associate Professor	103 (37.6%)	171 (62.4%)	274 (100.0%)
Assistant Professor	163 (46.7%)	186 (53.3%)	349 (100.0%)
Col. Totals	375 (38.1%)	609 (61.9%)	984 (100.0%)

This pattern is statistically significant. (Chi-square = 20.6, d.f. = 2, $p < .0001$).

(e) MD-Ph.D Faculty with a research doctorate (Ph.D.) in addition to an M.D. degree were not more likely or less likely to respond to our survey of research activity. The following table summarizes our findings:

	Non-respondents	Respondents	Row Total
MD only	320 (37.6%)	530 (62.4%)	850 (100.0%)
MD - PhDs	55 (41.0%)	75 (59.0%)	134 (13.6%)

(Chi-square = .43 with 1 degree of freedom, p = .51).

DISCUSSION

The comparison of respondents with non-respondents suggests that faculty who are relatively more involved in research and who have achieved higher academic ranks (possibly as a result of their research) were more likely to respond to our survey than were faculty with less research activity and lower academic rank. Respondents were not older, on the average, than non-respondents, so differences in rank are not likely to be attributable to differences in age. The difference in rank is probably one of achievement.

Basic science MD faculty are generally involved in research to a greater extent than are MD clinical science faculty. The difference between respondents and non-respondents in research activity is not due, however, to over-representation of basic science faculty among respondents. The response rate for basic science faculty was 58 percent, compared with 61 percent over all departments.

The apparent tendency for clinical faculty with greater research responsibility to respond at higher rates was not observed for MD faculty in basic science departments. We do not know how to explain this finding. It may simply be an artifact of the limitations inherent in the response categories of FRS-based variables.

CONCLUSION

Two variables, Major Responsibility Code for research (from the FRS) and Rhode's derived index of research involvement (computed from the Major Responsibility Code), indicate a possible bias in our survey (people with higher levels of research activity are probably over-represented in our survey). Although the differences between mean values of time in research (survey data) were found to be significantly different for groups of faculty having different Major Responsibility Codes and RESIN values (Faculty Roster data), neither FRS-based variable was found to be highly correlated with an individual faculty member's level of research activity as independently measured by self-reported levels of effort. For this study, therefore, neither variable is sufficiently precise to be used to develop numerical weights to balance our responding sample with the whole sample or with the population of medical school faculty.

We should expect our survey results, therefore, to over-estimate the research activity and productivity of MDs on medical school faculties to an unknown, but probably limited, extent. We judge th extent of overestimation to be minimal because the difference between respondents' and non-respondents' RESIN values, while real (statistically significant), was small (26.4 versus 23.1 on a scale of 100). We will acknowledge this in our report.

The purpose of our study is to project the expected rate of change in future research output from career profiles and changing age distributions.

While our estimated career profiles may be elevated above levels for a "typical" medical faculty MD, the added numbers of research-involved faculty may actually increase the sensitivity of our measure of change in research output.

AAMC FACULTY ROSTER

AAMC Form FR-1
Rev. 9/88

(Policy Release Statement on Final Page)

APPENDIX A

1. DATE OF FORM COMPLETION: (U) ___/___/___ (Month / Day / Year)

2. MEDICAL SCHOOL REPORTING: (U) _____

3. OPTIONAL INFORMATION: (C) _____ (For school use only)

A. BACKGROUND INFORMATION

4. NAME OF FACULTY MEMBER: (U)
   4a. LAST _____ (Indicate if Jr., III, etc.)
   4b. FIRST _____
   4c. MIDDLE _____

5. SOCIAL SECURITY NUMBER: (C) ___/___/___

6. SEX (Check one): (R) 1 ___ Male 2 ___ Female

7. ETHNIC/RACIAL SELF IDENTIFICATION: (R) (Check only one)
   1 ___ American Indian or Alaskan native
   2 ___ Asian or Pacific Islander
   3 ___ Black, not of Hispanic origin
   4 ___ Mexican American or Chicano (Hispanic)
   5 ___ Puerto Rican (Hispanic)
   6 ___ Other Hispanic
   7 ___ White, not of Hispanic origin
   0 ___ Do not wish to respond

8. DATE OF BIRTH: (R) ___/___/___ (Month / Day / Year)

9. BIRTHPLACE (Country) (R) _____

10. CURRENT CITIZENSHIP (Country) (U) _____

10a. VISA STATUS OF NON-U.S. CITIZENS: (R) (Check one)
   1 ___ Temporary
   2 ___ Permanent
   9 ___ Not Applicable (U.S. Citizen)

B. CURRENT APPOINTMENT INFORMATION

11. PRIMARY APPOINTMENT IN MEDICAL SCHOOL: (U)
IF PRIMARY APPOINTMENT IS NOT IN MEDICAL SCHOOL, check here ☐ and go to Item 12 (i.e., the primary appointment may be in a School of Dentistry, Nursing, Pharmacy, etc.)

11a. MEDICAL SCHOOL DEPARTMENT (Or Administrative Unit Equal to or above Dept. level) _____

11b. ARE YOU THE CHAIRPERSON OF THIS UNIT? ☐ Yes ☐ No

11c. ACADEMIC RANK (in Primary Department) _____ (Enter exact wording of academic rank)

11d. EQUIVALENT ACADEMIC RANK: (Indicate the closest equivalent rank to the rank entered in Item 11c.) (Check only one)
   1 ___ Professor 6 ___ Instructor
   2 ___ Associate Professor 8 ___ Other
   3 ___ Assistant Professor 0 ___ None/Not Applicable

12. JOINT APPOINTMENT MEDICAL SCHOOL DEPARTMENT: (U)
IF NO JOINT APPOINTMENT is held in the medical school check here ☐ and go to Item 13.

12a. MEDICAL SCHOOL DEPARTMENT (Or Administrative Unit Equal to or above Dept. level) _____

12b. ARE YOU THE CHAIRPERSON OF THIS UNIT? ☐ Yes ☐ No

12c. ACADEMIC RANK (in Joint Department) _____ (Enter exact wording of academic rank)

12d. EQUIVALENT ACADEMIC RANK: (Indicate the closest equivalent rank to the one entered in Item 12c.) (Check only one)
   1 ___ Professor 6 ___ Instructor
   2 ___ Associate Professor 8 ___ Other
   3 ___ Assistant Professor 0 ___ None/Not Applicable

13. NATURE OF EMPLOYMENT: (C) (Check only one)
   Salaried Appointments in the Medical School
   1 ___ SFT Strict full time in the medical school
   2 ___ GFT Geographic full time in the medical school
   3 ___ PTS Part time salaried in the medical school
   Salaried Appointments in an Affiliated Institution (including V.A. teaching hospitals) (Check most appropriate for medical school appointment)
   4 ___ SFTA Strict full time in an affiliated institution
   5 ___ GFTA Geographic full time in an affiliated institution
   6 ___ PTSA Part time salaried in an affiliated institution
   13a. _____ (Name of affiliated institution)
   VOLUNTEER STATUS
   7 ___ VUL Volunteer (Not salaried by either the medical school or an affiliated institution)

14. BEGINNING MONTH AND YEAR OF CURRENT, CONTINUOUS EMPLOYMENT AS A SALARIED FACULTY MEMBER AT THIS SCHOOL OR ONE OF ITS AFFILIATED INSTITUTIONS: (C) ___/___ (Month / Year)

15. TENURE STATUS: (C) (Check one)
   1 ___ Tenured
   2 ___ On Tenure Track (eligible for tenure)
   3 ___ Not on Tenure Track
   4 ___ Tenure Not Available at the Institution

16. MAJOR AREAS OF RESPONSIBILITY FOR THE MEDICAL SCHOOL: (C)
Indicate usual functional activities in any combination of Teaching/Instruction, Research, Patient Care, Administration, or Other Professional Activity. If a Primary responsibility for the medical school exists, enter "P" in the appropriate box. Check (X) other applicable areas only if they are performed at least 10% of the time for the medical school.
   ☐ Teaching/Instruction
   ☐ Research
   ☐ Patient Care (Patient Education)
   ☐ Administration
   ☐ Other Professional Activities

C. PROFESSIONAL EMPLOYMENT HISTORY (U)

17. YEAR OF FIRST SALARIED FACULTY APPOINTMENT AT A U.S. MEDICAL SCHOOL: (U) _____
(Includes appointments while salaried by an affiliated institution if a faculty appointment was held)

18. PROFESSIONAL EMPLOYMENT OR TRAINING ACTIVITY IMMEDIATELY PRIOR TO FIRST U.S. MEDICAL SCHOOL SALARIED ACADEMIC FACULTY EMPLOYMENT: (U)
CHECK ONLY ONE

PROFESSIONAL EMPLOYMENT
- 01 ___ U.S. Non-Medical Higher Education Institution
- 02 ___ U.S. Medical School - Volunteer Faculty
- 03 ___ U.S. Medical School - Non-Faculty Position
- 04 ___ U.S. Primary/Secondary Educational Institution
- 05 ___ Private Practice of Medicine
- 06 ___ U.S. Hospital (Non-Federal)
- 07 ___ State or Local Government (U.S.)
- 08 ___ U.S. Active Military Service
- 09 ___ U.S. Government - DOD & Military Hospitals
- 10 ___ U.S. Government - PHS (Include PHS Hospitals, NIH, & NIMH)
- 11 ___ U.S. Government - Veterans Administration (Include V.A. Hospitals)
- 12 ___ U.S. Government - Other
- 13 ___ Private Business or Industry
- 14 ___ Foundation, Research Institute, Association (or other non-profit organization)
- 15 ___ Foreign Employment
- 16 ___ Other Employment (Specify) _____

OR PROFESSIONAL TRAINING
- 20 ___ Internship/Residency
- 21 ___ NIH/NIMH Training Program
- 22 ___ U.S. Medical School
- 23 ___ Other U.S. Higher Education Institution
- 24 ___ Foreign Educational Institution
- 25 ___ Other Professional Training (Specify) _____

19-24. PREVIOUS PROFESSIONAL EMPLOYMENT: (U)
(List most recent employment first.)

	Years From (a)	Years To (b)	Type of Employment (If Academic, Enter School Name and Location) (If Non-Academic, Enter from Professional Employment List above) (Report internships, residencies and fellowships in Items 31-37, 42-45, and 47-52) (c)	If Employment was on Faculty of a Medical School, Indicate: Check if Medical School Faculty Status (d)	Major Areas of Responsibility (e)* (Check as applicable) Teaching	Research	Patient Care	Admin.	Other	Medical School Department (f)	Nature of Employment (Full or Part Time Salaried or Volunteer) (g)	Highest Academic Rank Held (h)**
19												
20												
21												
22												
23												
24												

Complete only if faculty status held

*Enter "P" if one activity was a primary responsibility for the medical school; check (X) other areas only if performed at least 10% of the time for the medical school.

**Indicate closest equivalents academic rank from following list:
1 - Professor
2 - Assoc. Professor
3 - Asst. Professor
4 - Instructor
8 - Other
0 - None/Not Applicable

D. EDUCATION AND TRAINING (U)

25-30 EARNED DEGREES AT THE BACHELOR'S LEVEL AND ABOVE. (If two degrees at the same level are held, enter the more recent.)

25. IF NO EARNED DEGREES, PLEASE CHECK ☐

		SPECIFY DEGREE (a)	FIELD OF STUDY (Select from Discipline List) (b)	INSTITUTION CONFERRING DEGREE (c)	STATE (If U.S.) COUNTRY (If Foreign)	YEAR COMPLETED (d)
26	M.D., D.O., M.B.B.S., OR FOREIGN EQUIVALENT		MEDICINE			
27	PH.D. OR EQUIVALENT					
28	OTHER HEALTH RELATED DOCTORATE					
29	MASTERS					
30	BACHELORS					

M.D.'S ONLY (INCLUDING D.O.'S AND FOREIGN EQUIVALENT) COMPLETE THIS SECTION: ITEMS 31-45 (Ph.D.'s and Ph.D. Candidates, go to Items 47-52)

A-3

31-37. POST M.D. INTERNSHIPS AND RESIDENCIES IN THE U.S.A.: (U)

		HOSPITAL (a)	CITY	STATE	YEAR COMPLETED (b)	
31. INTERNSHIP IN THE U.S.A. ☐ NONE	32					
34. RESIDENCIES IN THE U.S.A. ☐ NONE (Report fellowships in Items 43-45)		RESIDENCY PROGRAM (Select from Residency Program List) (a)	HOSPITAL(S) at which residency requirements completed. (b)	CITY / STATE	YEAR COMPLETED (c)	BOARD ELIGIBILITY Circle one (d)
	35					Yes / No
	36					Yes / No
	37					Yes / No

39-41. MEDICAL SPECIALTY OR SUB-SPECIALTY AND U.S. BOARD CERTIFICATIONS (M.D.'S ONLY): (U)

(Select from M.D. Specialty List)

		U.S. Board Certified?	Year Certified
39a	Primary Specialty _____	b. ☐ Yes ☐ No	c. _____
40a	Second Specialty _____	b. ☐ Yes ☐ No	c. _____
41a	Third Specialty _____	b. ☐ Yes ☒ No	c. _____

42-45. POST M.D. FELLOWSHIPS OF SIX MONTHS' DURATION OR LONGER FOR RESEARCH OR CLINICAL TRAINING: (U)

42 ☐ NONE

	Indicate Research (RI) or Clinical (CI) Training (a)	INSTITUTION OF TRAINING (b)	SPECIALTY/DISCIPLINE (Select From Specialty or Discipline List) (c)	SOURCE OF AWARD (Select from List Below) (d)	YEARS From (e)	YEARS To (f)
43						
44						
45						

SOURCE OF AWARD LIST

1 NIH	National Institutes of Health	4 NSF	National Science Foundation	7 FDN	Foundation, society, association
2 PHS	Other Public Health Service	5 VA	Veterans Administration	8 IND	Industry, business
3 DHHS-Other	Department of Health & Human Services - formerly DHEW	6 FED-Other	Federal - Other	9 OTH	All other, please specify

PH.D.'S AND PH.D. CANDIDATES ONLY COMPLETE THIS SECTION

47-52. PRE- AND POST-PH.D. RESEARCH TRAINING FELLOWSHIPS OF SIX MONTHS' DURATION OR LONGER: (U)

47 ☐ NONE

Do not duplicate information supplied in Items 43-45

A-4

	PRE- OR POST-DOCTORAL (a)	INSTITUTION OF TRAINING (b)	DISCIPLINE (Select from Discipline List) (c)	SOURCE OF AWARD (Select from List Above) (d)	YEARS From (e)	YEARS To (f)
48						
49						
50						
51						
52						

DATA RELEASE POLICY

Please provide signature consent/non-consent to release your record for medical school/federal agencies recruitment purposes.

Yes Consent _____

No Non-consent _____

For purpose other than recruitment, and for faculty who do not elect to release their data, the following policy is in effect:

Items designated (C). Confidential, will be released only to the individual faculty member and to an authorized representative of the school. Items designated (R). Restricted, will be furnished to authorized individuals at member schools and others at the discretion of the AAMC President. Unrestricted, (U). Items are considered directory information. Aggregates of any class of data items may be published.

FACULTY ROSTER UPDATE FORM

APPENDIX A (Cont'd)

SCHOOL
DEPT.
NAME: LAST
FIRST
MIDDLE
SSN
STATUS

DATA RELEASE

EFFECTIVE DATE OF DEACTIVATION

Mo. / Day / Yr.

RESIGNED, OTHER EMPLOYMENT

01 ___ U.S. Non-Medical Higher Education Institution
02 ___ U.S. Medical School - Volunteer Faculty
03 ___ U.S. Medical School - Non-Faculty Position
04 ___ U.S. Primary/Secondary Educational Institution
05 ___ Private Practice of Medicine
06 ___ U.S. Hospital (Non-Federal)
07 ___ State or Local Government (U.S.)
08 ___ U.S. Active Military Service
09 ___ U.S. Gov't. - DOD & Military Hosps.
10 ___ U.S. Gov't. - PHS (Incl. Hosps., NIH & NIMH)
11 ___ U.S. Gov't. - Veterans Admin. (Incl. Hosps.)
12 ___ U.S. Gov't. - Other
13 ___ Private Business or Industry
14 ___ Foundation, Research Institute, Association (or other non-profit organization)
15 ___ Foreign Employment
17 ___ Faculty of another U.S. Medical School (Specify) _____
16 ___ Other Employment (Specify) _____

RESIGNED TO ENTER TRAINING

20 ___ Internship/Residency
21 ___ NIH/NIMH Training Program
22 ___ U.S. Medical School
23 ___ Other U.S. Higher Education Institution
24 ___ Foreign Educational Institution
25 ___ Other Professional Training (Specify) _____
26 ___ Resigned, Other Reason (Specify) _____

EXTENDED LEAVE (6 mos. or longer)

35 ___ Illness
36 ___ Sabbatical
37 ___ Military
38 ___ Maternity
39 ___ Other (Specify) _____

OTHER

40 ___ Retired
41 ___ Deceased
42 ___ Contract expired or not renewed,
43 ___ Person not known at this School

DATE UPDATE PREPARED

Mo. / Day / Yr.

3 OPTIONAL INFORMATION (For School Use Only)

4 NAME: 4a. Last _____
4b. First _____
4c. Middle _____

5 SSN: ___ / ___ / ___

6 SEX: M ☐ F ☐

7 ETHNIC GROUP: _____

8 BIRTHDATE: _____

9 BIRTHPLACE: _____

10 CURRENT CITIZENSHIP: _____

10a VISA STATUS: TEMP. ☐ PERM. ☐

PRIMARY MEDICAL SCHOOL DEPARTMENT:

11a _____

11b CHAIRPERSON THIS UNIT? ☐ YES ☐ NO

11c RANK (in Primary Department): _____ (Enter exact wording of academic rank)

11d EQUIVALENT RANK:
1 ___ Professor
2 ___ Associate Professor
3 ___ Assistant Professor
4 ___ Instructor
8 ___ Other
0 ___ None/Not Applicable

11e EFFECTIVE DATE OF RANK CHANGE: ___ / ___ Mo. Yr.

JOINT MEDICAL SCHOOL DEPARTMENT:

12a _____

12b CHAIRPERSON THIS UNIT? ☐ YES ☐ NO

12c RANK (in Joint Department): _____ (Enter exact wording of academic rank)

12d EQUIVALENT RANK:
1 ___ Professor
2 ___ Associate Professor
3 ___ Assistant Professor
4 ___ Instructor
8 ___ Other
0 ___ None/Not Applicable

COMPLETE ONLY ITEMS REQUIRING ADDITION, CHANGE, OR CORRECTION

13 NATURE OF EMPLOYMENT:
1 ___ SFT: Strict full-time in the medical school
2 ___ GFT: Geographic full-time in the medical school
3 ___ PTS: Part-time salaried in the medical school
4 ___ SFTA: Strict full-time in an affiliated institution
5 ___ GFTA: Geographic full-time in an affiliated institution
6 ___ PTSA: Part-time salaried in an affiliated institution
7 ___ VOL: Voluntary (Not salaried by either the medical school or the affiliated institution)

13a _____ (name of affiliated institution)

14 BEGINNING OF CURRENT CONTINUOUS SALARIED FACULTY APPOINTMENT AT THIS SCHOOL OR ONE OF ITS AFFILIATED INSTITUTIONS: ___ / ___ Mo. Yr.

15 TENURE STATUS:
1 ___ Tenured
2 ___ On Tenure Track (eligible for tenure)
3 ___ Not on Tenure Track
4 ___ Tenure Not Available at the Institution

16 MAJOR AREAS OF RESPONSIBILITY FOR THE MEDICAL SCHOOL:

If a Primary responsibility for the medical school exists, enter "P" in the appropriate box. Check (X) other applicable areas only if they are performed at least 10% of the time for the medical school.

☐ Teaching/Instruction
☐ Research
☐ Patient Care (Patient Education)
☐ Administration
☐ Other Professional Activities

17 YEAR OF FIRST SALARIED FACULTY APPOINTMENT AT A U.S. MEDICAL SCHOOL: _____

18 ACTIVITY PRIOR TO FIRST U.S. MEDICAL SCHOOL SALARIED ACADEMIC FACULTY EMPLOYMENT: _____

FACULTY ROSTER UPDATE FORM

AAMC FORM FR-28
Rev. 9/79

PROFESSIONAL EMPLOYMENT HISTORY: Delete Line(s): 19☐ 20☐ 21☐ 22☐ 23☐ 24☐

LINE NUMBER	YEARS FR	YEARS TO	EMPLOYER (c)	FACULTY (d)	Major Areas of Responsibility (e) TRPAO	DEPARTMENT (f)	Nature of Employment (g)	Highest Equivalent Rank (h)

EARNED DEGREES: Delete Line(s): 26☐ 27☐ 28☐ 29☐ 30☐

LINE NUMBER	DEGREE (a)	FIELD OF STUDY (b)	INSTITUTION CONFERRING DEGREE (c)	YEAR (d)

INTERNSHIP IN THE U.S.A.: Delete Line: 32☐ Hospital: (a)_____ Year (b) _____

RESIDENCIES IN THE U.S.A.: Delete Line(s): 35☐ 36☐ 37☐

LINE NUMBER	RESIDENCY PROGRAM (a)	HOSPITAL (b)	YEAR (c)	Board Eligible (d)
				☐ Yes ☐ No
				☐ Yes ☐ No

MEDICAL SPECIALTY OR SUB-SPECIALTY AND U.S. BOARD CERTIFICATION:

		SPECIALTY (a)	U.S. Board Certified?(b)	Year of Certification (c)
First Specialty:	39		☐ Yes ☐ No	
Second Specialty:	40		☐ Yes ☐ No	
Third Specialty:	41		☐ Yes ☐ No	

U.S. MEDICAL SCHOOL RANK HISTORY (Salaried Appts. Only)

RANK	Mo./Yr. First Achieved (a)	INSTITUTION (b)
60 Professor		
61 Assoc. Prof.		
62 Asst. Prof.		
63 Instructor		
64 Other		

POST-M.D. FELLOWSHIPS FOR RESEARCH OR CLINICAL: Delete Line(s): 43☐ 44☐ 45☐

LINE NUMBER	RESEARCH OR CLINICAL TRAINING (a)	INSTITUTION OF TRAINING (b)	SPECIALTY/DISCIPLINE (c)	SOURCE (d)	FROM (e)	TO (f)

PRE- AND POST-PH.D. RESEARCH TRAINING FELLOWSHIPS: Delete Line(s): 48☐ 49☐ 50☐ 51☐ 52☐

LINE NUMBER	PRE OR POST (a)	INSTITUTION OF TRAINING (b)	DISCIPLINE (c)	SOURCE (d)	FROM (e)	TO (f)

Appendix II.3.1
PERCENT OF FIRST YEAR ON FACULTY SPENT ON RESEARCH

YEAR OF MD

	1944-1952	1953-1957	1958-1962	1963-1967	1968-1972	
MEDICAL	(24) 39.08	(19) 55.00	(28) 58.96	(27) 44.22	(30) 43.10	48.09
SURGICAL	(22) 37.36	(22) 38.09	(23) 26.70	(23) 26.17	(23) 28.13	30.84
BEHAVIORAL	(22) 21.27	(23) 26.43	(20) 36.80	(26) 25.31	(27) 23.30	26.65
HOSPITAL-BASED	(20) 21.00	(24) 29.13	(29) 39.38	(22) 27.50	(20) 22.00	27.93
BASIC SCIENCE	(23) 60.22	(23) 61.96	(26) 72.88	(22) 65.14	(20) 62.40	64.37
	35.22	44.38	47.69	36.58	35.31	

(MARGINAL SUMS WEIGHTED BY POPULATION SIZE)

Appendix II.3.2
PERCENT OF FIFTH YEAR ON FACULTY SPENT ON RESEARCH

YEAR OF MD

	1944-1952	1953-1957	1958-1962	1963-1967	1968-1972	
MEDICAL	(21) 42.05	(18) 46.56	(26) 51.19	(26) 37.12	(11) 37.73	42.46
SURGICAL	(20) 34.50	(21) 31.19	(19) 17.26	(19) 29.58	(8) 16.50	25.71
BEHAVIORAL	(21) 30.33	(21) 20.76	(16) 44.88	(23) 30.04	(10) 47.00	35.01
HOSPITAL-BASED	(18) 22.44	(22) 32.00	(29) 35.00	(18) 32.11	(12) 37.33	31.87
BASIC SCIENCE	(21) 60.48	(24) 62.29	(25) 60.80	(21) 68.81	(11) 54.36	61.52
	36.94	39.42	40.84	35.29	35.12	

(MARGINAL SUMS WEIGHTED BY POPULATION SIZE)

Appendix II.3.3
PERCENT OF TENTH YEAR ON FACULTY SPENT IN RESEARCH

YEAR OF MD

	1944-1952	1953-1957	1958-1962	1963-1967	1968-1972	
MEDICAL	(17) 41.18	(17) 39.29	(22) 46.05	(9) 26.33	(0) .00	28.71
SURGICAL	(20) 26.70	(16) 24.39	(16) 14.31	(0) .00	(0) .00	12.36
BEHAVIORAL	(17) 34.35	(20) 15.00	(12) 39.92	(7) 28.57	(0) .00	23.87
HOSPITAL-BASED	(16) 23.75	(18) 34.50	(27) 21.07	(7) 35.14	(1) 40.00	30.79
BASIC SCIENCE	(21) 53.33	(23) 57.30	(22) 60.00	(13) 65.00	(1) 50.00	57.06
	34.98	34.56	34.56	24.28	9.55	

(MARGINAL SUMS WEIGHTED BY POPULATION SIZE)

Appendix II.3.4
PERCENT OF FIFTHTEENTH YEAR ON FACULTY SPENT ON RESEARCH

	YEAR OF MD					
	1944-1952	1953-1957	1958-1962	1963-1967	1968-1972	
MEDICAL	(15) 32.20	(14) 42.29	(4) 42.50	(0) .00	(0) .00	20.80
SURGICAL	(17) 16.88	(16) 19.13	(0) .00	(0) .00	(0) .00	6.51
BEHAVIORAL	(15) 27.00	(14) 20.14	(5) 42.40	(0) .00	(0) .00	17.70
HOSPITAL-BASED	(13) 23.85	(15) 27.07	(13) 24.08	(0) .00	(0) .00	14.50
BASIC SCIENCE	(20) 51.25	(19) 50.00	(11) 58.45	(3) 50.00	(0) .00	46.38
	28.59	33.19	30.77	1.98	.00	

(MARGINAL SUMS WEIGHTED BY POPULATION SIZE)

Appendix II.3.5
TOTAL WORK WEEK IN HOURS

	YEAR OF MD					
	1944-1952	1953-1957	1958-1962	1963-1967	1968-1972	
MEDICAL	(25) 58.40	(19) 59.84	(29) 56.41	(28) 57.79	(30) 58.57	58.13
SURGICAL	(26) 65.50	(22) 60.41	(23) 63.30	(26) 59.92	(23) 63.61	62.47
BEHAVIORAL	(25) 56.08	(23) 51.35	(21) 57.81	(26) 56.15	(27) 53.93	55.19
HOSPITAL-BASED	(22) 55.50	(24) 50.92	(29) 55.38	(22) 58.14	(22) 57.23	55.59
BASIC SCIENCE	(23) 53.30	(24) 55.17	(26) 55.92	(22) 57.05	(23) 55.39	55.09
	58.54	57.10	57.70	58.15	58.74	

(MARGINAL SUMS WEIGHTED BY POPULATION SIZE)

Appendix II.3.6
PERCENT OF FACULTY REPORTING THAT THEY WERE "ON SERVICE" DURING WEEK OF SURVEY

	YEAR OF MD					
	1944-1952	1953-1957	1958-1962	1963-1967	1968-1972	
MEDICAL	(24) 41.67	(16) 18.75	(28) 32.14	(27) 37.04	(28) 32.14	32.61
SURGICAL	(24) 87.50	(21) 57.14	(22) 54.55	(19) 68.42	(22) 45.45	62.80
BEHAVIORAL	(21) 38.10	(21) 52.38	(17) 35.29	(25) 52.00	(22) 59.09	47.27
HOSPITAL-BASED	(18) 38.89	(19) 42.11	(25) 56.00	(17) 52.94	(17) 47.06	47.77
BASIC SCIENCE	(18) 5.56	(21) 4.76	(25) 8.00	(22) .00	(22) 22.73	7.05
	46.71	33.10	40.63	46.36	39.27	

(MARGINAL SUMS WEIGHTED BY POPULATION SIZE)

Appendix II.3.7
WEEKS PER YEAR "ON SERVICE"

	YEAR OF MD					
	1944-1952	1953-1957	1958-1962	1963-1967	1968-1972	
MEDICAL	(24) 19.88	(16) 16.56	(29) 15.21	(28) 18.14	(29) 18.66	17.69
SURGICAL	(26) 36.54	(18) 32.17	(21) 39.10	(20) 36.70	(21) 28.76	34.92
BEHAVIORAL	(20) 26.45	(16) 28.13	(19) 18.79	(24) 26.79	(22) 36.59	27.31
HOSPITAL-BASED	(17) 22.88	(16) 16.17	(25) 27.16	(18) 24.94	(16) 32.06	24.92
BASIC SCIENCE	(20) 1.30	(20) 5.50	(25) 3.32	(21) 3.19	(20) 8.65	3.75
	22.76	19.81	22.24	23.40	24.20	

(MARGINAL SUMS WEIGHTED BY POPULATION SIZE)

Appendix II.3.8
TOTAL HOURS PER WEEK SPENT IN RESEARCH

	YEAR OF MD					
	1944-1952	1953-1957	1958-1962	1963-1967	1968-1972	
MEDICAL	(25) 15.52	(19) 25.47	(29) 25.07	(28) 20.86	(30) 24.70	22.51
SURGICAL	(26) 10.23	(22) 12.14	(22) 11.77	(26) 14.65	(23) 18.13	13.41
BEHAVIORAL	(25) 10.12	(23) 9.17	(21) 23.43	(26) 20.62	(27) 18.07	16.57
HOSPITAL-BASED	(22) 13.95	(24) 12.42	(29) 14.97	(22) 20.77	(22) 18.82	16.35
BASIC SCIENCE	(23) 28.96	(24) 32.83	(26) 34.50	(22) 41.00	(23) 33.74	33.42
	14.88	19.26	20.62	20.33	22.13	

(MARGINAL SUMS WEIGHTED BY POPULATION SIZE)

Appendix II.3.9
TOTAL HOURS PER WEEK SPENT IN TEACHING RELATED TO RESEARCH

	YEAR OF MD					
	1944-1952	1953-1957	1958-1962	1963-1967	1968-1972	
MEDICAL	(23) 3.57	(17) 4.71	(25) 3.80	(21) 3.62	(24) 5.88	4.35
SURGICAL	(16) 2.88	(17) 2.59	(17) 2.65	(21) 6.29	(17) 3.29	3.66
BEHAVIORAL	(21) 3.10	(20) 4.15	(15) 3.47	(19) 2.05	(17) 2.59	3.03
HOSPITAL-BASED	(18) 3.67	(19) 3.05	(20) 3.95	(16) 7.56	(18) 3.67	4.46
BASIC SCIENCE	(17) 9.18	(20) 5.95	(23) 8.65	(18) 10.50	(20) 7.65	8.44
	3.93	3.97	3.86	5.11	4.78	

(MARGINAL SUMS WEIGHTED BY POPULATION SIZE)

Appendix II.3.10
TOTAL HOURS PER WEEK SPENT IN PATIENT CARE RELATED TO RESEARCH

	YEAR OF MD					
	1944-1952	1953-1957	1958-1962	1963-1967	1968-1972	
MEDICAL	(22) 3.82	(17) 3.59	(25) 4.12	(21) 4.43	(25) 2.96	3.78
SURGICAL	(18) 4.61	(17) 4.35	(19) 3.61	(20) 6.80	(18) 3.33	4.63
BEHAVIORAL	(20) 1.65	(20) 1.90	(15) 2.27	(19) 4.74	(19) 3.21	2.80
HOSPITAL-BASED	(17) 3.41	(19) 2.53	(19) 4.16	(15) 7.87	(18) 2.89	4.27
BASIC SCIENCE	(16) .00	(18) 1.06	(22) 1.27	(14) .85	(21) 3.05	.98
	3.35	3.22	3.71	5.49	3.03	

(MARGINAL SUMS WEIGHTED BY POPULATION SIZE)

Appendix II.3.11
TOTAL HOURS PER WEEK SPENT IN TEACHING (NOT RESEARCH RELATED)

	YEAR OF MD					
	1944-1952	1953-1957	1958-1962	1963-1967	1968-1972	
MEDICAL	(25) 12.88	(18) 8.44	(29) 7.21	(28) 10.68	(30) 11.97	10.24
SURGICAL	(26) 13.85	(22) 10.09	(23) 12.04	(26) 10.65	(23) 10.09	11.35
BEHAVIORAL	(25) 7.60	(23) 10.00	(21) 8.90	(26) 8.38	(27) 10.26	9.00
HOSPITAL-BASED	(22) 12.86	(24) 9.83	(29) 9.17	(22) 11.18	(22) 11.91	11.00
BASIC SCIENCE	(23) 8.22	(24) 6.71	(26) 5.04	(21) 2.95	(23) 5.43	6.06
	12.19	9.07	9.63	10.30	11.23	

(MARGINAL SUMS WEIGHTED BY POPULATION SIZE)

Appendix II.3.12
TOTAL HOURS PER WEEK SPENT IN PATIENT CARE (NOT RESEARCH RELATED)

	YEAR OF MD					
	1944-1952	1953-1957	1958-1962	1963-1967	1968-1972	
MEDICAL	(25) 19.16	(18) 13.89	(29) 15.69	(28) 17.11	(30) 14.00	15.43
SURGICAL	(26) 24.35	(22) 20.18	(23) 28.43	(26) 27.62	(23) 27.87	25.93
BEHAVIORAL	(25) 20.92	(23) 14.70	(21) 16.29	(26) 14.77	(27) 16.67	16.70
HOSPITAL-BASED	(22) 18.86	(24) 14.63	(29) 18.14	(22) 18.41	(22) 21.82	18.47
BASIC SCIENCE	(21) .81	(24) 3.17	(26) 2.81	(20) 2.90	(23) 7.91	2.89
	18.60	14.66	18.12	18.82	17.01	

(MARGINAL SUMS WEIGHTED BY POPULATION SIZE)

Appendix II.3.13
TOTAL HOURS PER WEEK SPENT IN ADMINISTRATION (NOT RESEARCH RELATED)

	YEAR OF MD					
	1944-1952	1953-1957	1958-1962	1963-1967	1968-1972	
MEDICAL	(25) 10.84	(19) 13.21	(29) 8.45	(28) 9.14	(30) 10.00	10.16
SURGICAL	(26) 17.08	(22) 18.00	(23) 11.57	(25) 6.08	(23) 7.52	11.68
BEHAVIORAL	(25) 17.44	(23) 17.48	(21) 9.19	(26) 12.38	(27) 9.93	12.92
HOSPITAL-BASED	(21) 10.48	(24) 14.04	(29) 13.10	(22) 7.77	(22) 4.68	9.91
BASIC SCIENCE	(22) 16.09	(24) 12.46	(26) 13.62	(21) 11.10	(23) 8.30	13.11
	13.08	14.64	10.44	8.55	8.36	

(MARGINAL SUMS WEIGHTED BY POPULATION SIZE)

Appendix II.3.14
RESEARCH AS A PERCENT OF TOTAL HOURS WORKED

	YEAR OF MD					
	1944-1952	1953-1957	1958-1962	1963-1967	1968-1972	
MEDICAL	(25) 27.31	(19) 42.12	(29) 45.58	(28) 36.93	(30) 41.67	39.08
SURGICAL	(26) 15.91	(22) 20.43	(22) 18.96	(25) 25.59	(23) 28.31	21.95
BEHAVIORAL	(25) 17.06	(23) 17.71	(21) 40.77	(26) 35.66	(27) 32.67	28.23
HOSPITAL-BASED	(22) 24.54	(24) 24.43	(29) 28.23	(22) 36.17	(22) 30.01	28.92
BASIC SCIENCE	(23) 55.30	(24) 60.75	(26) 63.22	(22) 74.57	(23) 59.68	61.70
	26.10	33.36	37.08	35.81	36.84	

(MARGINAL SUMS WEIGHTED BY POPULATION SIZE)

Appendix II.3.15
RESEARCH-RELATED TEACHING AS A PERCENT OF TOTAL HOURS WORKED

	YEAR OF MD					
	1944-1952	1953-1957	1958-1962	1963-1967	1968-1972	
MEDICAL	(23) 5.74	(17) 7.72	(25) 6.87	(21) 6.31	(24) 9.86	7.39
SURGICAL	(16) 4.55	(17) 4.03	(17) 3.81	(21) 11.19	(17) 5.59	6.05
BEHAVIORAL	(21) 5.14	(20) 5.31	(15) 5.99	(19) 3.83	(17) 4.58	5.48
HOSPITAL-BASED	(18) 6.79	(19) 5.52	(20) 7.15	(16) 12.57	(18) 5.89	7.71
BASIC SCIENCE	(17) 17.42	(20) 10.78	(23) 15.54	(18) 20.07	(20) 12.06	15.45
	6.75	6.77	6.74	8.92	7.95	

(MARGINAL SUMS WEIGHTED BY POPULATION SIZE)

Appendix II.3.16
RESEARCH-RELATED PATIENT CARE AS A PERCENT OF TOTAL HOURS WORKED

	YEAR OF MD					
	1944-1952	1953-1957	1958-1962	1963-1967	1968-1972	
MEDICAL	(22) 6.16	(17) 5.98	(25) 7.14	(21) 7.97	(25) 4.76	6.43
SURGICAL	(18) 7.12	(17) 6.89	(18) 5.47	(20) 12.24	(18) 5.51	7.63
BEHAVIORAL	(20) 3.01	(20) 3.77	(15) 3.77	(19) 10.17	(19) 5.86	5.41
HOSPITAL-BASED	(17) 5.91	(19) 4.25	(19) 7.21	(15) 14.86	(18) 4.61	7.57
BASIC SCIENCE	(16) .00	(18) 1.81	(22) 2.55	(14) 1.58	(21) 4.91	1.75
	5.46	5.35	6.27	10.13	4.95	

(MARGINAL SUMS WEIGHTED BY POPULATION SIZE)

Appendix II.3.17
RESEARCH-RELATED TEACHING AS A PERCENT OF TOTAL RESEARCH HOURS

	YEAR OF MD					
	1944-1952	1953-1957	1958-1962	1963-1967	1968-1972	
MEDICAL	(24) 31.60	(16) 15.52	(25) 17.41	(21) 16.16	(24) 21.58	20.07
SURGICAL	(16) 26.85	(18) 17.88	(18) 26.63	(22) 42.51	(17) 17.31	27.16
BEHAVIORAL	(20) 24.51	(20) 43.71	(16) 23.53	(20) 12.25	(15) 14.94	23.08
HOSPITAL-BASED	(18) 29.51	(21) 32.53	(21) 21.83	(16) 38.52	(19) 20.82	28.60
BASIC SCIENCE	(15) 37.85	(20) 20.94	(23) 25.40	(18) 25.77	(20) 18.69	27.54
	30.15	22.15	21.20	26.15	20.06	

(MARGINAL SUMS WEIGHTED BY POPULATION SIZE)

Appendix II.3.18
RESEARCH-RELATED PATIENT CARE AS A PERCENT OF TOTAL RESEARCH HOURS

	YEAR OF MD					
	1944-1952	1953-1957	1958-1962	1963-1967	1968-1972	
MEDICAL	(23) 26.80	(16) 16.66	(25) 17.50	(21) 21.58	(25) 15.68	19.41
SURGICAL	(18) 39.75	(18) 26.16	(19) 41.05	(21) 38.89	(18) 20.65	33.91
BEHAVIORAL	(19) 24.15	(20) 29.79	(16) 13.33	(20) 31.26	(17) 23.10	24.20
HOSPITAL-BASED	(17) 26.47	(21) 28.46	(20) 25.50	(15) 45.56	(18) 26.26	30.69
BASIC SCIENCE	(14) .00	(18) 5.14	(22) 8.59	(14) 4.77	(21) 9.45	4.78
	26.65	21.31	23.20	29.97	19.05	

(MARGINAL SUMS WEIGHTED BY POPULATION SIZE)

Appendix II.3.19
PATIENT CARE AS A PERCENT OF TOTAL HOURS WORKED

	YEAR OF MD					
	1944-1952	1953-1957	1958-1962	1963-1967	1968-1972	
MEDICAL	(25) 32.21	(18) 22.65	(29) 27.25	(28) 29.79	(30) 21.28	26.49
SURGICAL	(26) 36.37	(22) 33.54	(23) 45.81	(26) 45.47	(23) 43.60	41.40
BEHAVIORAL	(25) 38.88	(23) 28.80	(21) 28.95	(26) 26.76	(27) 31.67	31.02
HOSPITAL-BASED	(22) 34.98	(24) 26.86	(29) 31.92	(22) 31.71	(22) 40.66	33.70
BASIC SCIENCE	(21) 2.06	(24) 5.51	(26) 4.99	(20) 4.65	(23) 15.63	5.40
	31.44	25.48	30.88	32.21	29.74	

(MARGINAL SUMS WEIGHTED BY POPULATION SIZE)

Appendix II.3.20
TEACHING AS A PERCENT OF TOTAL HOURS WORKED

	YEAR OF MD					
	1944-1952	1953-1957	1958-1962	1963-1967	1968-1972	
MEDICAL	(25) 20.44	(18) 13.97	(29) 12.53	(28) 17.79	(30) 20.34	17.12
SURGICAL	(26) 21.18	(22) 16.47	(23) 19.78	(26) 17.49	(23) 16.24	18.06
BEHAVIORAL	(25) 14.00	(23) 19.42	(21) 14.35	(26) 15.11	(27) 19.18	16.31
HOSPITAL-BASED	(22) 23.49	(24) 19.36	(29) 16.61	(22) 19.11	(22) 21.73	20.01
BASIC SCIENCE	(23) 15.23	(24) 12.17	(26) 9.71	(21) 4.88	(23) 9.82	10.92
	20.22	15.91	14.60	17.28	19.46	

(MARGINAL SUMS WEIGHTED BY POPULATION SIZE)

Appendix II.3.21
ADMINISTRATION AS A PERCENT OF TOTAL HOURS WORKED

	YEAR OF MD					
	1944-1952	1953-1957	1958-1962	1963-1967	1968-1972	
MEDICAL	(25) 20.04	(19) 23.19	(29) 14.64	(28) 15.45	(30) 16.72	17.63
SURGICAL	(26) 26.54	(22) 29.56	(23) 17.28	(25) 9.90	(23) 11.85	18.41
BEHAVIORAL	(25) 30.06	(23) 34.07	(21) 15.93	(26) 22.47	(27) 16.49	23.45
HOSPITAL-BASED	(21) 18.18	(24) 27.35	(29) 23.25	(22) 13.00	(22) 7.60	17.61
BASIC SCIENCE	(22) 28.84	(24) 21.57	(26) 23.15	(21) 17.34	(23) 14.87	22.66
	22.63	26.10	17.61	14.43	13.96	

(MARGINAL SUMS WEIGHTED BY POPULATION SIZE)

APPENDIX.II.4

SELECT RESEARCH JOURNALS

Journal Name	Number of Articles	Level of Journal
ACT CRYST	0	4
ACT CRYST A	0	4
ACT CRYST B	0	4
ACT CYTOL	35	2
AM HEART J	116	2
AM J ANAT	23	4
AM J CARD	193	2
AM J CLIN N	35	3
AM J CLIN P	51	2
AM J DIG DI	35	2
AM J DIS CH	92	2
AM J EPIDEM	34	2
AM J HU GEN	14	3
AM J MED	131	2
AM J MED SC	42	2
AM J OBST G	234	2
AM J OPHTH	8	2
AM J ORTHOD	0	2
AM J P ANTH	1	4
AM J PATH	61	3
AM J PHYSL	288	4
AM J TROP M	12	2
AM J VET RE	14	3
AM R RESP D	70	2
AM ZOOLOG	1	4
ANALYT BIOC	6	4
ANALYT CHEM	2	3
ANAT REC	27	4
ANESTH ANAL	107	2
ANESTHESIOL	349	2
ANN HUM GEN	4	3
ANN NY ACAD	107	4
ANN OTOL RH	33	2
ANN R BIOCH	1	4
ANN R MICRO	1	4
ANN R PHYSL	7	4
ANN RHEUM D	4	2
APPL MICROB	12	4
ARCH BIOCH	36	4
ARCH DERMAT	17	2
ARCH ENV HE	10	2
ARCH IN MED	62	2
ARCH NEUROL	53	2
ARCH OPHTH	67	2
ARCH ORAL B	0	3
ARCH PATH	42	2
ARTH RHEUM	25	2
B WHO	0	2
BEHAV RES M	6	4
BIOC BIOP A	115	4
BIOC BIOP R	41	4
BIOCH PHARM	60	3
BIOCHEM	45	4
BIOCHEM GEN	4	4
BIOCHEM J	19	4
BIOCHEM MED	6	3
BIOL NEONAT	5	3
BIOPHYS J	9	4
BIOPOLYMERS	0	4
BLOOD	67	3
BR J HAEM	7	3
BRAIN RES	77	4
CALCIF TISS	10	3
CANC CH P1	14	3
CANC CH P2	0	3
CANC CH P3	1	3
CANC CHEMOT	11	3
CANCER	267	2
CANCER RES	109	3
CARBOHY RES	0	4
CHEM COMM	0	4
CHILD DEV	0	2
CHROMOSOMA	1	4
CIRCUL RES	124	3
CIRCULATION	304	2
CLIN CHEM	12	3
CLIN CHIM A	10	3
CLIN EXP IM	13	2
CLIN ORTHOP	51	2
CLIN PHARM	82	2
CLIN SC MOL	6	3
CLIN SCI	14	3
COLD S HARB	8	4
COMP BIOC A	1	4
COMP BIOC B	1	4
COMP BIOC C	0	4
COMP BIOCH	12	4
COMPUT BIOM	5	3
DEVELOP BIO	19	4
DEVELOP MED	4	2
DIABETES	17	3
EEG CL NEUR	40	3
ENDOCRINOL	86	3
EPILEPSIA	6	2
EUR J BIOCH	2	4
EUR J PHARM	31	3
EXP BRAIN R	4	4
EXP CELL RE	19	4
EXP EYE RES	3	3
EXP MOL PAT	16	3
EXP NEUROL	47	4
EXP PARASIT	1	4
EXPERIENTIA	19	4
FEBS LETTER	10	4
FED PROC	256	4
FERT STERIL	32	2
GASTROENTY	97	2
GEN C ENDOC	2	4
GENETICS	3	4
HUMAN BIOL	0	3
IEEE BIOMED	0	3
IMMUNOCHEM	19	3
IMMUNOLOGY	10	3
INORG CHEM	8	4
INT J CANC	12	3
INV OPHTH	21	3
INV OPHTH V	4	3
INV RADIOL	50	2
INV UROL	12	2
J ACOUST SO	0	3

APPENDIX II.4
(Cont'd)
SELECT RESEARCH JOURNALS

Journal Name	Number of Articles	Level of Journal
J AGR FOOD	2	3
J ALLERG CL	26	2
J ALLERGY	21	2
J AM CHEM S	20	4
J AM VET ME	12	2
J ANIM SCI	3	3
J APP PHYSL	54	4
J BACT	10	4
J BIOL CHEM	181	4
J BIOMECHAN	2	4
J CELL BIOL	58	4
J CELL PHYS	8	4
J CHEM PHYS	0	4
J CHEM S	0	4
J CHEM S CH	0	4
J CHEM S D	0	4
J CHROMAT	6	3
J CLIN ENO	96	3
J CLIN INV	201	3
J COM PHYSL	1	4
J COMP NEUR	27	4
J DAIRY SCI	9	3
J DENT RES	4	3
J ENDOCR	8	3
J EX AN BEH	0	3
J EXP AN BE	0	3
J EXP C PSY	0	2
J EXP MED	107	3
J EXP PSY A	0	4
J EXP PSY G	0	4
J EXP PSY H	0	4
J EXP PSY P	0	4
J EXP PSYCH	1	4
J EXP ZOOL	2	4
J GEN MICRO	0	4
J GEN PHYSL	24	4
J GEN VIROL	3	4
J GERONTOL	11	2
J HETERO CH	0	4
J HIST CYTO	41	4
J IMMUNOL	227	3
J INFEC DIS	57	2
J INVES DER	21	3
J LA CL MED	131	3
J LIPID RES	23	4
J MED CHEM	8	3
J MED ENT	1	3
J MEMBR BIO	14	4
J MOL BIOL	13	4
J NAT CANC	44	3
J NE EXP NE	13	3
J NE NE PSY	12	2
J NEUROCHEM	20	4
J NEURPHYSL	24	4
J NUCL MED	152	2
J NUTR	30	3
J ORG CHEM	13	4
J PARASITOL	22	4
J PEDIAT	131	2
J PERIODONT	4	2
J PHARM EXP	292	3
J PHARM SCI	9	3
J PHYS CHEM	0	4
J PHYSL LON	38	4
J POL SC PP	0	3
J PROTOZOOL	5	4
J PSYCH RES	19	2
J REPR FERT	6	3
J RETIC SOC	12	3
J SPEECH HE	0	2
J SURG RES	82	2
J THEOR BIO	2	4
J ULTRA RES	25	4
J VIROLOGY	5	4
LAB ANIM CA	2	3
LAB ANIM SC	6	3
LAB INV	46	3
LANCET	160	2
LIFE SCI	55	4
LIFE SCI P1	0	4
LIFE SCI P2	0	4
LIPIDS	10	4
MEDICINE	14	2
METABOLISM	46	3
MOLEC PHARM	21	3
MUTAT RES	0	4
N ENG J MED	331	2
NATURE	143	4
NATURE-BIOL	12	4
NEPHRON	28	2
NEUROENDOCR	9	3
NEUROLOGY	73	2
NEUROPHARM	10	3
NEUROPSYCHC	3	3
ONCOLOGY	3	2
ORAL SURG O	6	2
P NAS US	98	4
P SOC EXP M	182	3
PEDIAT RES	37	3
PEDIATRICS	103	2
PERC MOT SK	8	2
PERC PSYCH	2	4
PHARM REV	2	3
PHYSIOL REV	2	4
PHYSL BEHAV	16	4
PHYTOCHEM	0	4
PLANT PHYSL	0	4
PSYCHOL REP	4	2
PSYCHOPHAR	14	3
PSYCHOPHARM	13	3
PSYCHOPHYSL	28	3
PSYCHOS MED	59	2
RADIAT RES	20	4
RADIOLOGY	310	2
RESP PHYSL	20	4
SCIENCE	188	4
STAIN TECH	6	4
STEROIDS	4	4
TERATOLOGY	4	4
TETRAHEDR L	0	4

APPENDIX II.4
(Cont'd)
SELECT RESEARCH JOURNALS

Journal Name	Number of Articles	Level of Journal
THROMB DIAT	20	3
TOX APPL PH	16	3
TRANSPLAN P	63	3
TRANSPLANT	52	3
VIROLOGY	12	4
VISION RES	0	4
VOX SANGUIN	5	3
YALE J BIOL	18	3
CANCER CHEM	17	3
PERIODONTIC	0	2
TRANSACT AMER SOC ARTIFICIAL INTERNAL ORGANS	31	3
METHODS ENZY	6	4
BULL OF MT DESERT ISL BIO LAB	6	4
J APPL PHYSIOL	110	4
THE PHYSIOLOGIST	57	4
BULL DE PHYSIOPATHOLOGIE RESPIRATOIRE	1	4
BIOCHEM PREP	1	4
SLEEP RES	8	3
J OF COMP PSYCH	1	4
BULL SOC CHEM BIOL	1	4
MICROVASCULAR RES	1	3
BIRTH DEFECTS SERIES	3	3
ARCH INT PHARMACODYN THER	5	3
PSYCHOPHARMA BULL	12	3
J BIOPHYSICS & BIOCHEM CYTOLOGY	6	4
RETICULOENDOTHELIAL SOCIETY	1	3
ORIGINAL ARTICAL SERIES	13	3
LYMPHOKINE REPORTS	1	3
CANAD J BIOCHEM PHYSIOL	4	4
J OF LAB CLIN INVEST	0	3
PAVLOVIAN J BIOL SCIENCES	1	4
BIOCHEM BIOPHYS ACTA BIOMEMBRANES	1	4
PROC WEST PHARMACOL SOC	1	3
PROC HLTH PHYSICS SOC	1	4
ISOZYMES	1	4
J PHYSIOL	6	4
PROC INT'L U PHYSIOL	8	4
UMSCHAU	1	4
PROC SOC OF PHOTO-OPTICAL INS ENG	2	4
EXPER BIOL & MED	1	4
COMP BIOMED RES	1	3
PROG LIPID RES	1	4
CLIN RES PROC	8	3
ARCH BIOCHEM	2	3
TRANS ASSOC AM PHYSICIANS	12	3
RECENT PROGRESS HORMONE R	3	3
J EXPER BRAIN RES	1	3
ADV IN DRUG RES	1	4
QUAL REV BULL	3	4
CHEM PATH PRARM	2	4
AEC REPORTS UR (PHYSIOLOGY)	2	4
DECUS SYMPOSIUM MINI PAPERS	2	3
DECUS PROCEED	2	3
ACM SIGUE BULL COMPUTERS	1	4
PHYSIOLOGY TEACHER	2	3
IEEE TRANS NUCL SCI	2	4
PSYCHOPHARMACOL BULL	1	3
BBA	2	4
ANN FED CLIN RES	1	3
ANN SOC ROY ZOOL BELG	2	4
ANN PROC ELECTRON MICR SOC AMER	1	4
ANN REV PHARMACOL AND TOXICOL	1	4
ADV BIOCHEM PSYCHOPHARMACOL	1	4
J DRUG RESEARCH	1	3
EVIDENCES AND HYPOTHESES	1	3
ACTA SCAND	1	4
THE CHROMOSOME NEWSLETTER	1	3
TRANS AUTOMATIC CONTROL	1	3
MED ELECTRON BIOL ENG (ENGLAND)	1	4
PROC BIOMED SCI INST	1	3
TRACE SUPPLEMENT	1	4
TRANSCULT PSYCH REV	1	3
ANTHROPOLICICAL LINGUISTICS	1	4
US ARMY MED RES LAB REP	3	3
DRUG METAB DISPOS	8	3
INT J MED RES	1	3
RECENT RESULTS IN CANCER RES	2	3
J PHYSICS MED BIOL	1	4
NEURORADIOLOY SUPPLEMENT	2	3
J NEUROPATH & APPL NEUROBIOL	1	3
J AUTONOMIC NRVE SYSTEM	1	4
SCI INSTRUM	1	3
LAB MED	1	3
A ZELLFORSCH	1	4
LAB PRIMATE NEWSLETTER	2	3
AM J PHYSICAL ANTHROPOLOGY	3	4
BASICS OF RD	1	3
MED INSTRUMENTATION	3	3
AUTOMATED ANALYSIS	1	3
NIH TECHNICAL WORKSHOP	0	4
CADAVER	3	4
IGAKUNO AYUMI	1	4
INT J NUCL BIOL	2	4
J CARDIOVAS PHYSIOL	1	4
SOC IND APPL MATH REVS	1	4
BULL MATH BIOPHYSICS	1	4
APPL MATH COMP	1	4
TRANS ASAIO	2	3
BULL PROSTHETICS RES	1	3
CUTANEOUS NODULES PRECEDING SYSTEMATIZATION	1	3
BBRC	1	4
PROGRESS IN IMMUNOLOGY	1	4
LA RICERA CLIN LAB	2	3
ADV PHARMACOL THERAP	1	4
NEUROTOXICOLOGY	1	3
ACTA D'ANESTHESIOLOGIE	1	4
RASS NEUR VEGET	1	3
PORTUG ACTA BIOL	1	4
CYTOTECHNOLOGIST BULL	5	3
J INT RADIOL ONCOL BIOL & PHYSICS	1	3
J INT ANESTH RES SOC	1	3
IRCS MED SCI	4	4
LINACRE QUART	2	3
INT REV PHYSIOL	1	4
RECENT PROGRESS IN HORMONE RES	1	3
J PROJEC TECH	1	3
RECENT ADV BIOLOGIC PSYCH	1	4
PROC ASCO/AACR	4	3
HUMAN ORGAN	4	3
J COMP PHYSIOL PSYCHOL	1	4

APPENDIX II.4
(Cont'd)
SELECT RESEARCH JOURNALS

Journal Name	Number of Articles	Level of Journal
AAAS	1	4
NEURO-PSYCHOPHARMAK	1	4
IRCS	1	4
HUMAN IMMUNOLOGY	4	3
PHOSPHATE METABOLISM	2	4
BR J PHARMACOL & CHEM	1	4
J PSYCHOPHARMACOL	1	4
DEVEL NEUROSCIENCE	1	4
ANLAGE	2	4
AD IN BIOCHEM PHARMACOL	1	4
HOPPE SEYLER'S Z. PHYSIOL CHEM	1	4
ACTA CIETIFICA VENZEOLANA	1	4
LABORATORY MED	3	3
ANN CLIN RES HELSINKI	1	4
BIOL OF THE ACTINOMYCETES & RELATED ORGANISMS	2	4
INT J NEUROPSYCH	1	3
ABREACTION	1	4
PSYCHOPHARM BULL	2	3
J BIOCHEM PHARM	1	4
BIOCHEM PHYSIOL	1	4
HALVETICA PPHYSIO ET PHARMACOL ACTA	1	4
INTERN UNION OF BIOCHEM PUBLIZATION	1	4
TRANS AM SOC NEUROCHEM	6	4
ABS SOC NEURDSCI	1	4
J AUTO NERV SYS	2	4
INT J CLIN & EXP HYPNOSIS	7	3
ANN REPORTS MED CHEM	2	4
EUR J STERIODS	1	4
RAD RES	1	3
ACANCER	1	3
ARCH ITAL SCI FARMACOL	2	4
J CLIN EXP PSYCHOTHER	3	3
NURSING RES	2	3
J APPL PSYCHOL	1	4
BIOCHEM CLIN	1	3
ARCH INST BIOL ANDINA	1	4
ARCH BIOL ANDINA	1	4
BIOMEDICAL SCI INSTRUMENTATION	3	3
ANN REV PHARM	1	3
PROG BRAIN RES	2	4
AM SOC PHARMACOL E XP THERAP	2	4
EXISTENT PSYCH	1	4
CONTEMP CELL RES	1	4
ADV PATHOBIOL	1	4
J PARENTERAL AND ENTERAL NUTRITION	2	3
SCAN J LAB & CLIN MED SUPPL	1	3
J APPL RADIATION & ISOTOPES	1	4
J MICROVASCULAR RES	1	3
J INT BIOCHEM	1	4
NEDERLI TIJDSCHRIFT V GEENEESKUNDE	2	3
BACT PROC	1	4
J INT MED R ES	1	3
WALOA Z ALKOHOLIZMEN	1	3
WIEDZA I ZYCIE	1	4
PHARM. PHYSIOL & BEH	1	3
J BIOL PSYCH	2	4
BROOKHAVEN NATIONAL LAB	1	4
J EXTRA-CORPOREAL TECH	2	3
REV IG MICROB EPIDEMIOL	1	3
MICROB PARAZITOL & EPIDEMIOL	3	3
ADVANCES IN BIO OF SKIN	1	4
J PHARMACOKIN BIOPHARM	1	4
J ORTHOMOLECULAR PSYCHIATRY	2	4
INFORMATIONEN ZUR KERFORSCHUNG UND KERNTECHNIK	2	4
J EEG CLINICAL NEURO-PHYSIOLOGY	1	3
THE WORM RUNNERS DIGEST	1	4
BBA BIOMEMBRANES REVIEWS	2	4
ADV IN EXP MED AND BIOL	3	4
WR. TIERARZTL MONATSSCHRIFT	1	4
PATH U PHARMAKOL	5	4
NATURWISSENSCHAFTEN	1	4
ARBEITSPHYSIOL	1	4
MATHEMNATURWISS KI	1	4
NEUE Z. ARZTL FORTBLDG	1	3
INTERNAT Z. ANGEW PHYSIOL EINSCHL ARBEITPHYSIOG	2	4
TIDSSKRIFT FOR DEN NORSKE LAEGEFORENING	1	3
MED TRIAL TECHNIQUES QUARTERLY	1	3
MICROCIRCULATION	1	3
REVUE DE CYTOLOGIE CLINIQUE	1	3
PROC ELECTRONMICROSCOPY SOC OF AM	1	4
ANIMAL HUSBANDRY	1	4
METABOLIC RESEARCH	1	3
J ENERGY MED	1	4
J STATIST COMPU SIMUL	1	4
BOL ZOOL E BIOL MAR. N.S.	1	4
NEUROSCIENCES RESEARCH PROGRAM BULLETIN	1	3
AM GEN PHYSIOLOGY	1	4
PROC ZOOL SOC LONDON	1	4
J ANIM MORPH PHYSIOL	1	4
PROG CANCER RES	1	3
INVEST CETECEA (BERNE)	1	4
J APPL NEUROPHYSIOLOGY	1	4
TRANS SOC PED RES	1	3
PRO SOUTHERN SOC PED RES	1	3
J EXP HEMATOLOGY	1	3
MED PRIMATOLOGY	1	4
BIOL ANAT	2	4
J EXP PATH	1	4
MEMBRANE MEABOLISM	1	4
FEDERATION BULL	1	4
AM SOC ZOOLOGISTS	1	4
ARCHIVOS DE INVESTIGACION MECICA	1	3
STUDIEN ZUR WISSENSCHAFTSTHEORIA	1	4
ATTI VI CONG INT MICROBIOL	2	4
RIGSS COMUN VI CONG INT MICROBIOL	1	4
PROGR PROTOZOOL	3	4
SEVENTH INT CONT PATH ACAD NAZ LINCEI, PROBL ATT DI SCI CLLT	1	3
COMP IMMUN MICRO INF DIS	1	3
BERICHTE DER PHYSIK-MEDIZIN(GESELLSCH ZU WURZBURG)	1	4
PROC 18TH ANNUAL CONFRENCE ON ENGINEERING IN MED AND BIOL	2	3
PROC 48TH ANNUAL MEETING OF THE ENDOCRINE SOC	1	3
PHYSIOL FOR PHYSICIANS	1	4
THEORY J APPL PHYSIOL	1	4
BORDEN REV NUTRITION RES	1	3
INSERM	3	3
NED TIJD GEENEESK	1	3
PROC DUTCH SOC CLIN CHEM	1	3
Z ZELLFORSCH	17	4
DAIRY SCIENCE	3	4
PHARMACOLIGIA CLINICA	1	3

APPENDIX II.4
(Cont'd)
SELECT RESEARCH JOURNALS

Journal Name	Number of Articles	Level of Journal
TRANS AM SOC NEUROCHEM	1	4
TRANS AND STUDIES OF THE COLLEGE OF PHYSICIANS	1	3
PROC TISSUE CULTURE ASSN AMER	1	4
CATALYST	4	4
J PSYCHEDELIC DRUGS	5	3
PSYCHOSOCIAL (GRASSROOTS)	1	4
PERSPECTIVES IN VIROLOGY	1	4
PROC CHEM SOC	2	4
SELECTED METHODS IN CLINICAL CHEMESTRY	1	3
	1	3

PROJECTED PROPORTION OF FACULTY IN EACH CAREER AGE AT A 6.0% GROWTHRATE

	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990
0	.0002	.0003	.0003	.0003	.0003	.0003	.0003	.0003	.0003	.0003	.0003	.0003	.0003
1	.0003	.0004	.0005	.0005	.0005	.0005	.0005	.0005	.0005	.0005	.0005	.0005	.0005
2	.0006	.0007	.0006	.0009	.0009	.0009	.0009	.0009	.0009	.0009	.0009	.0009	.0009
3	.0027	.0033	.0034	.0036	.0036	.0036	.0036	.0037	.0037	.0037	.0037	.0037	.0037
4	.0060	.0096	.0101	.0102	.0103	.0104	.0104	.0105	.0105	.0105	.0106	.0106	.0106
5	.0181	.0176	.0190	.0194	.0195	.0196	.0197	.0198	.0199	.0200	.0200	.0200	.0200
6	.0267	.0262	.0257	.0269	.0273	.0274	.0275	.0277	.0278	.0279	.0279	.0280	.0280
7	.0283	.0339	.0333	.0329	.0339	.0343	.0344	.0346	.0347	.0349	.0350	.0350	.0350
8	.0344	.0346	.0393	.0388	.0385	.0394	.0397	.0399	.0401	.0403	.0404	.0405	.0405
9	.0397	.0360	.0361	.0401	.0398	.0395	.0403	.0406	.0408	.0410	.0411	.0412	.0413
10	.0404	.0395	.0364	.0365	.0399	.0396	.0394	.0401	.0404	.0406	.0408	.0409	.0410
11	.0418	.0400	.0392	.0364	.0365	.0395	.0393	.0392	.0398	.0401	.0402	.0404	.0405
12	.0421	.0412	.0396	.0389	.0365	.0366	.0393	.0391	.0390	.0395	.0398	.0399	.0400
13	.0443	.0405	.0397	.0383	.0377	.0356	.0357	.0381	.0379	.0378	.0383	.0385	.0387
14	.0407	.0419	.0386	.0379	.0367	.0361	.0343	.0344	.0365	.0364	.0363	.0367	.0369
15	.0386	.0391	.0402	.0373	.0366	.0355	.0351	.0334	.0335	.0354	.0353	.0352	.0356
16	.0420	.0371	.0376	.0386	.0359	.0354	.0344	.0340	.0325	.0326	.0343	.0342	.0341
17	.0373	.0401	.0358	.0362	.0371	.0347	.0342	.0333	.0330	.0317	.0317	.0333	.0317
18	.0396	.0358	.0384	.0345	.0349	.0357	.0335	.0331	.0323	.0320	.0308	.0309	.0323
19	.0378	.0379	.0345	.0368	.0333	.0336	.0343	.0324	.0320	.0313	.0311	.0300	.0301
20	.0340	.0363	.0364	.0333	.0354	.0322	.0325	.0332	.0315	.0311	.0305	.0302	.0293
21	.0344	.0326	.0347	.0348	.0319	.0339	.0309	.0312	.0319	.0303	.0300	.0294	.0292
22	.0343	.0333	.0316	.0335	.0336	.0310	.0328	.0301	.0304	.0310	.0295	.0292	.0287
23	.0331	.0326	.0316	.0301	.0318	.0319	.0295	.0312	.0287	.0290	.0295	.0282	.0280
24	.0301	.0317	.0311	.0303	.0289	.0305	.0305	.0284	.0299	.0277	.0279	.0284	.0272
25	.0249	.0286	.0301	.0296	.0288	.0275	.0290	.0291	.0271	.0285	.0265	.0267	.0271
26	.0250	.0235	.0269	.0282	.0277	.0270	.0259	.0272	.0273	.0255	.0267	.0249	.0251
27	.0212	.0239	.0225	.0256	.0268	.0264	.0258	.0247	.0259	.0260	.0244	.0255	.0238
28	.0189	.0201	.0226	.0213	.0241	.0252	.0249	.0243	.0233	.0245	.0245	.0230	.0241
29	.0182	.0179	.0185	.0212	.0201	.0226	.0236	.0233	.0228	.0219	.0229	.0230	.0216
30	.0186	.0173	.0170	.0180	.0208	.0190	.0214	.0223	.0220	.0215	.0207	.0216	.0217
31	.0165	.0175	.0164	.0161	.0170	.0189	.0179	.0201	.0209	.0207	.0202	.0195	.0203
32	.0175	.0156	.0165	.0154	.0158	.0160	.0177	.0169	.0188	.0196	.0194	.0189	.0183
33	.0181	.0166	.0148	.0156	.0146	.0144	.0152	.0167	.0160	.0178	.0185	.0182	.0179
34	.0152	.0178	.0156	.0140	.0147	.0138	.0136	.0143	.0158	.0151	.0167	.0173	.0171
35	.0162	.0142	.0158	.0146	.0131	.0138	.0130	.0128	.0134	.0147	.0141	.0156	.0162
36	.0096	.0169	.0133	.0147	.0136	.0123	.0129	.0122	.0120	.0126	.0138	.0132	.0145
37	.0089	.0090	.0156	.0123	.0136	.0126	.0114	.0120	.0113	.0112	.0117	.0128	.0122
38	.0075	.0084	.0084	.0145	.0114	.0127	.0117	.0106	.0111	.0105	.0104	.0109	.0119
39	.0064	.0068	.0075	.0076	.0129	.0102	.0113	.0105	.0095	.0100	.0094	.0093	.0097
40	.0057	.0057	.0060	.0067	.0067	.0113	.0090	.0099	.0092	.0084	.0088	.0083	.0082
41	.0201	.0150	.0182	.0179	.0183	.0186	.0227	.0236	.0251	.0255	.0251	.0252	.0248

APPENDIX II. 6.1 (CONT'D)

PROJECTED NUMBER OF ALL PUBLICATIONS AT A 6.0% GROWTHRATE

ROW	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990
MED	35647	37660	39824	42138	44604	47251	49843	52797	55898	59273	62908	66716	70777
SUR	13239	13901	14610	15349	16160	17016	17937	18929	19986	21122	22339	23635	25028
BEH	4176	4412	4666	4938	5222	5531	5842	6189	6551	6941	7364	7807	8260
HOS	13628	14366	15146	15957	16815	17719	18675	19724	20846	22049	23336	24701	26157
BAS	3970	4171	4388	4617	4869	5142	5438	5759	6098	6465	6859	7275	7719
ALL	70661	74510	78635	82998	87670	92668	97735	103399	109379	115650	122806	130133	137961

PERCENTAGE CHANGE FROM 1978

ROW	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990
MED	5.6	11.7	18.2	25.1	32.6	39.8	46.1	56.8	66.3	76.5	87.2	98.5
SUR	5.0	10.4	15.9	22.1	28.5	35.5	43.0	51.0	59.5	68.7	78.5	89.0
BEH	5.6	11.7	18.2	25.0	32.4	39.9	45.2	56.9	66.2	76.3	86.9	97.3
HOS	5.4	11.1	17.1	23.4	30.0	37.0	44.7	53.0	61.8	71.2	81.2	91.9
BAS	5.1	10.5	16.3	22.7	29.7	37.0	45.1	53.6	62.9	72.5	83.3	94.4
ALL	5.4	11.3	17.5	24.1	31.1	38.3	46.3	54.8	64.0	73.8	84.2	95.2

PERCENTAGE CHANGE FROM PREVIOUS YEAR

ROW	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990
MED	5.6	5.7	5.8	5.9	5.9	5.5	5.9	5.9	6.0	6.1	6.1	6.1
SUR	5.0	5.1	5.1	5.3	5.3	5.4	5.5	5.6	5.7	5.8	5.8	5.9
BEH	5.6	5.8	5.8	5.8	5.9	5.6	5.9	5.9	5.9	6.1	6.0	6.1
HOS	5.4	5.4	5.4	5.4	5.4	5.4	5.6	5.7	5.8	5.8	5.8	5.9
BAS	5.1	5.2	5.2	5.5	5.7	5.6	5.9	5.9	6.0	6.1	6.1	6.1
ALL	5.4	5.5	5.5	5.6	5.7	5.5	5.8	5.8	5.9	6.0	6.0	6.0

PROJECTED NUMBER OF SPECIAL PUBLICATIONS AT A 6.0% GROWTHRATE

ROW	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990
MED	17549	18516	19576	20696	21885	23151	24412	25838	27346	28983	30747	32589	34560
SUR	2907	3052	3205	3365	3540	3734	3943	4166	4402	4654	4928	5216	5532
BEH	658	692	729	769	810	854	901	955	1013	1077	1144	1216	1292
HOS	6229	6556	6902	7260	7658	8071	8507	8982	9490	10045	10632	11259	11930
BAS	2184	2295	2414	2540	2679	2834	2995	3173	3362	3565	3783	4012	4256
ALL	29528	31111	32826	34629	36572	38645	40758	43114	45613	48324	51234	54293	57570

PERCENTAGE CHANGE FROM 1978

ROW	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990
MED	5.5	11.6	17.9	24.7	31.9	39.1	47.2	55.8	65.2	75.2	85.7	96.9
SUR	5.0	10.2	15.7	21.8	28.4	35.6	43.3	51.4	60.1	69.5	79.5	90.3
BEH	5.1	10.9	16.8	23.1	29.7	36.9	45.1	53.9	63.6	73.6	84.7	96.2
HOS	5.3	10.8	16.6	22.9	29.6	36.6	44.2	52.3	61.3	70.7	80.7	91.5
BAS	5.1	10.5	16.3	22.6	29.8	37.1	45.3	53.9	63.2	73.2	83.7	94.9
ALL	5.4	11.2	17.3	23.9	30.9	38.0	46.0	54.5	63.7	73.5	83.9	96.0

PERCENTAGE CHANGE FROM PREVIOUS YEAR

ROW	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990
MED	5.5	5.7	5.7	5.7	5.8	5.4	5.8	5.8	6.0	6.1	6.0	6.1
SUR	5.0	5.0	5.0	5.2	5.5	5.6	5.7	5.7	5.7	5.9	5.9	6.0
BEH	5.1	5.4	5.4	5.4	5.4	5.5	6.0	6.1	6.3	6.3	6.3	6.2
HOS	5.3	5.3	5.2	5.5	5.4	5.4	5.6	5.7	5.8	5.6	5.9	6.0
BAS	5.1	5.2	5.2	5.5	5.8	5.7	6.0	5.9	6.1	6.1	6.1	6.1
ALL	5.4	5.5	5.5	5.6	5.7	5.5	5.8	5.8	5.9	6.0	6.0	6.0

PUBLICATION PRODUCTIVITY AT THREE PERCENT GROWTH

PROJECTED PROPORTION OF FACULTY IN EACH CAREER AGE AT A 3.0% GROWTHRATE

	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990
0	.0002	.0002	.0002	.0002	.0002	.0002	.0002	.0002	.0002	.0002	.0002	.0002	.0002
1	.0003	.0004	.0004	.0004	.0004	.0004	.0004	.0004	.0004	.0004	.0004	.0004	.0004
2	.0006	.0006	.0007	.0007	.0007	.0007	.0007	.0007	.0007	.0007	.0007	.0007	.0007
3	.0027	.0027	.0027	.0028	.0028	.0028	.0028	.0028	.0028	.0028	.0028	.0028	.0028
4	.0080	.0080	.0079	.0078	.0079	.0079	.0079	.0080	.0080	.0080	.0081	.0081	.0081
5	.0181	.0153	.0152	.0150	.0150	.0151	.0151	.0152	.0152	.0153	.0154	.0154	.0154
6	.0267	.0240	.0215	.0214	.0212	.0212	.0213	.0214	.0215	.0216	.0217	.0217	.0217
7	.0283	.0318	.0294	.0271	.0270	.0269	.0269	.0270	.0271	.0273	.0274	.0275	.0275
8	.0344	.0329	.0355	.0337	.0317	.0316	.0315	.0316	.0317	.0319	.0320	.0321	.0322
9	.0397	.0353	.0340	.0366	.0346	.0329	.0328	.0328	.0328	.0330	.0331	.0332	.0333
10	.0404	.0393	.0354	.0341	.0365	.0347	.0332	.0331	.0331	.0332	.0334	.0335	.0336
11	.0418	.0398	.0388	.0353	.0342	.0362	.0347	.0333	.0333	.0333	.0334	.0336	.0337
12	.0421	.0412	.0394	.0384	.0353	.0343	.0362	.0346	.0336	.0336	.0336	.0337	.0338
13	.0443	.0408	.0400	.0384	.0375	.0346	.0337	.0354	.0342	.0331	.0331	.0331	.0332
14	.0407	.0424	.0393	.0385	.0370	.0362	.0336	.0328	.0344	.0333	.0323	.0323	.0323
15	.0386	.0396	.0411	.0382	.0375	.0361	.0354	.0330	.0323	.0337	.0327	.0318	.0318
16	.0420	.0375	.0384	.0398	.0372	.0361	.0352	.0345	.0324	.0317	.0331	.0321	.0313
17	.0373	.0407	.0366	.0374	.0387	.0361	.0356	.0344	.0338	.0318	.0312	.0324	.0316
18	.0396	.0362	.0394	.0356	.0363	.0371	.0352	.0347	.0336	.0331	.0312	.0306	.0318
19	.0378	.0385	.0353	.0383	.0347	.0351	.0365	.0344	.0339	.0329	.0324	.0306	.0301
20	.0340	.0368	.0375	.0345	.0372	.0339	.0346	.0356	.0336	.0332	.0323	.0316	.0302
21	.0344	.0332	.0358	.0364	.0336	.0362	.0331	.0337	.0347	.0328	.0324	.0315	.0311
22	.0343	.0337	.0325	.0350	.0356	.0329	.0354	.0324	.0330	.0340	.0322	.0319	.0310
23	.0331	.0332	.0326	.0315	.0338	.0343	.0319	.0341	.0314	.0320	.0329	.0312	.0309
24	.0301	.0322	.0322	.0317	.0306	.0328	.0333	.0310	.0331	.0305	.0311	.0319	.0304
25	.0249	.0291	.0311	.0311	.0306	.0296	.0317	.0321	.0300	.0320	.0296	.0301	.0305
26	.0250	.0240	.0279	.0297	.0297	.0293	.0284	.0303	.0307	.0287	.0306	.0283	.0288
27	.0212	.0243	.0234	.0271	.0268	.0288	.0284	.0275	.0293	.0298	.0279	.0296	.0275
28	.0189	.0205	.0234	.0225	.0260	.0276	.0276	.0272	.0264	.0281	.0285	.0267	.0284
29	.0182	.0182	.0197	.0224	.0216	.0248	.0264	.0264	.0260	.0252	.0268	.0272	.0255
30	.0186	.0177	.0177	.0190	.0217	.0209	.0240	.0254	.0254	.0254	.0243	.0259	.0262
31	.0165	.0179	.0170	.0170	.0183	.0208	.0200	.0229	.0243	.0243	.0240	.0233	.0247
32	.0175	.0159	.0172	.0163	.0164	.0176	.0198	.0192	.0219	.0231	.0232	.0228	.0222
33	.0181	.0169	.0153	.0165	.0156	.0158	.0189	.0191	.0184	.0210	.0222	.0222	.0219
34	.0152	.0173	.0162	.0146	.0159	.0152	.0182	.0162	.0183	.0177	.0201	.0212	.0212
35	.0182	.0145	.0165	.0155	.0141	.0152	.0145	.0145	.0155	.0174	.0168	.0191	.0201
36	.0096	.0174	.0139	.0157	.0148	.0135	.0145	.0139	.0139	.0148	.0166	.0161	.0182
37	.0089	.0092	.0164	.0131	.0149	.0140	.0128	.0137	.0131	.0131	.0140	.0157	.0152
38	.0075	.0086	.0088	.0156	.0125	.0142	.0[illegible]	.0122	.0131	.0125	.0125	.0133	.0149
39	.0064	.0069	.0079	.0081	.0142	.0114	.0[illegible]5	.0122	.0111	.0119	.0114	.0114	.0122
40	.0057	.0058	.0063	.0071	.0073	.0128	.0103	.0116	.0110	.0101	.0106	.0103	.0103
41	.0201	.0195	.0193	.0195	.0204	.021[illegible]	65	.0283	.0307	.0319	.0319	.0326	.0327

APPENDIX II.6.2 (CONT'D)

PROJECTED NUMBER OF ALL PUBLICATIONS AT A 3.0% GROWTHRATE

ROW	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990
MED	35647	36817	37977	39128	40273	41447	42417	43606	44796	46109	47526	48951	50453
SUR	13239	13571	13900	14205	14525	14932	15136	15451	15767	16096	16445	16805	17194
BEH	4176	4308	4446	4570	4695	4826	4943	5078	5211	5354	5513	5673	5843
HOS	13628	14011	14381	14723	15058	15384	15708	16067	16439	16830	17236	17656	18096
BAS	3970	4053	4133	4209	4291	4393	4472	4572	4676	4794	4923	5057	5195
ALL	70661	72760	74831	76835	78842	80872	82673	84774	86889	89185	91644	94141	96785

PERCENTAGE CHANGE FROM 1978

ROW	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990
MED	3.3	6.5	9.8	13.0	16.3	19.0	22.3	25.7	29.3	33.3	37.3	41.5
SUR	2.5	5.0	7.3	9.7	12.0	14.3	16.7	19.1	21.6	24.2	26.9	29.9
BEH	3.2	6.3	9.4	12.4	15.6	18.3	21.6	24.8	28.2	32.0	35.8	39.9
HOS	2.8	5.5	8.0	10.5	12.9	15.3	17.9	20.6	23.5	26.5	29.6	32.8
BAS	2.1	4.1	6.0	8.1	10.4	12.6	15.2	17.8	20.8	24.0	27.4	31.0
ALL	3.0	5.9	8.7	11.6	14.5	17.0	20.0	23.0	26.2	29.7	33.2	37.0

PERCENTAGE CHANGE FROM PREVIOUS YEAR

ROW	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990
MED	3.3	3.2	3.0	2.9	2.9	2.3	2.8	2.7	2.9	3.1	3.0	3.1
SUR	2.5	2.4	2.2	2.3	2.1	2.0	2.1	2.0	2.1	2.2	2.2	2.3
BEH	3.2	3.1	2.9	2.7	2.8	2.4	2.7	2.6	2.7	3.0	2.9	3.0
HOS	2.8	2.6	2.4	2.3	2.2	2.1	2.3	2.3	2.4	2.4	2.4	2.5
BAS	2.1	2.0	1.8	2.0	2.1	2.0	2.3	2.3	2.5	2.7	2.7	2.8
ALL	3.0	2.8	2.7	2.6	2.6	2.2	2.5	2.5	2.6	2.8	2.7	2.8

PROJECTED NUMBER OF SPECIAL PUBLICATIONS AT A 3.0% GROWTHRATE

ROW	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990
MED	17549	18093	18650	19187	19715	20245	20656	21239	21794	22403	23061	23715	24414
SUR	2907	2964	3017	3067	3122	3184	3247	3313	3379	3445	3526	3606	3694
BEH	658	674	690	706	720	733	747	765	783	804	827	851	876
HOS	6229	6385	6532	6667	6814	6953	7095	7245	7404	7561	7760	7948	8147
BAS	2194	2228	2271	2313	2357	2405	245	2515	2573	2639	2711	2765	2864
ALL	29528	30343	31162	31939	32728	33524	3424[illegible]	35077	35934	36877	37885	38905	39995

PERCENTAGE CHANGE FROM 1978

ROW	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990
MED	3.1	6.3	9.3	12.3	15.4	17.9	21.0	24.2	27.7	31.4	35.1	39.1
SUR	1.9	3.8	5.5	7.4	9.5	11.7	14.0	16.2	18.6	21.3	24.0	27.1
BEH	2.4	4.9	7.2	9.3	11.4	13.5	16.2	19.0	22.2	25.6	29.2	33.1
HOS	2.5	4.9	7.0	9.4	11.6	13.9	16.3	18.9	21.7	24.6	27.6	30.8
BAS	2.0	4.0	5.9	7.9	10.3	12.5	15.1	17.8	20.8	24.1	27.5	31.1
ALL	2.8	5.5	8.2	10.8	13.5	16.0	18.8	21.7	24.9	28.3	31.8	35.5

PERCENTAGE CHANGE FROM PREVIOUS YEAR

ROW	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990
MED	3.1	3.1	2.9	2.8	2.7	2.2	2.6	2.6	2.8	2.9	2.8	2.9
SUR	1.9	1.8	1.6	1.8	2.0	2.0	2.0	2.0	2.1	2.2	2.3	2.4
BEH	2.4	2.4	2.2	2.0	1.9	1.9	2.4	2.4	2.7	2.8	2.9	3.0
HOS	2.5	2.3	2.1	2.2	2.0	2.0	2.2	2.2	2.4	2.4	2.4	2.5
BAS	2.0	1.9	1.8	1.9	2.2	2.0	2.3	2.3	2.6	2.7	2.7	2.8
ALL	2.8	2.7	2.5	2.5	2.4	2.1	2.4	2.4	2.6	2.7	2.7	2.8

PUBLICATION PRODUCTIVITY AT ZERO PERCENT GROWTH

PROJECTED PROPORTION OF FACULTY IN EACH CAREER AGE AT A .0% GROWTH RATE

	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990
0	.0002	.0001	.0001	.0001	.0001	.0001	.0001	.0001	.0001	.0001	.0001	.0001	.0001
1	.0003	.0003	.0002	.0002	.0002	.0002	.0002	.0002	.0002	.0002	.0002	.0002	.0002
2	.0006	.0005	.0005	.0005	.0005	.0004	.0004	.0004	.0004	.0005	.0005	.0005	.0005
3	.0027	.0020	.0019	.0019	.0018	.0018	.0018	.0018	.0018	.0018	.0019	.0019	.0019
4	.0080	.0062	.0055	.0053	.0053	.0052	.0052	.0052	.0052	.0053	.0053	.0053	.0054
5	.0181	.0128	.0110	.0102	.0100	.0100	.0099	.0100	.0101	.0101	.0102	.0102	.0103
6	.0267	.0218	.0169	.0152	.0145	.0143	.0142	.0142	.0143	.0144	.0145	.0146	.0147
7	.0283	.0297	.0252	.0206	.0191	.0184	.0182	.0183	.0163	.0164	.0185	.0187	.0188
8	.0344	.0312	.0323	.0280	.0238	.0224	.0217	.0216	.0217	.0218	.0219	.0221	.0222
9	.0397	.0346	.0316	.0326	.0286	.0248	.0235	.0230	.0229	.0230	.0231	.0232	.0233
10	.0404	.0390	.0343	.0315	.0323	.0287	.0252	.0241	.0236	.0236	.0237	.0237	.0239
11	.0418	.0397	.0363	.0340	.0313	.0321	.0288	.0256	.0246	.0241	.0241	.0242	.0243
12	.0421	.0413	.0392	.0379	.0338	.0314	.0321	.0290	.0261	.0251	.0248	.0247	.0246
13	.0443	.0412	.0403	.0384	.0372	.0333	.0310	.0317	.0289	.0261	.0252	.0249	.0249
14	.0407	.0429	.0400	.0392	.0373	.0362	.0326	.0304	.0311	.0284	.0259	.0250	.0247
15	.0386	.0400	.0421	.0393	.0385	.0368	.0356	.0323	.0302	.0309	.0283	.0259	.0251
16	.0420	.0380	.0393	.0412	.0386	.0378	.0362	.0351	.0319	.0300	.0306	.0282	.0259
17	.0373	.0413	.0374	.0387	.0405	.0379	.0372	.0357	.0347	.0316	.0298	.0304	.0281
18	.0396	.0367	.0405	.0368	.0380	.0397	.0373	.0366	.0351	.0342	.0313	.0296	.0301
19	.0378	.0391	.0363	.0399	.0363	.0375	.0391	.0368	.0362	.0348	.0335	.0311	.0294
20	.0340	.0374	.0386	.0358	.0393	.0359	.0370	.0386	.0364	.0358	.0344	.0336	.0309
21	.0344	.0338	.0371	.0382	.0356	.0389	.0356	.0367	.0383	.0361	.0355	.0342	.0334
22	.0345	.0342	.0336	.0367	.0378	.0352	.0385	.0353	.0364	.0379	.0356	.0352	.0340
23	.0351	.0339	.0337	.0331	.0361	.0372	.0347	.0378	.0347	.0358	.0372	.0352	.0347
24	.0301	.0327	.0333	.0332	.0326	.0355	.0365	.0341	.0372	.0342	.0352	.0366	.0347
25	.0249	.0297	.0322	.0326	.0327	.0321	.0349	.0359	.0336	.0365	.0337	.0346	.0360
26	.0253	.0245	.0291	.0315	.0321	.0315	.0314	.0341	.0351	.0326	.0357	.0329	.0338
27	.0212	.0248	.0243	.0286	.0311	.0317	.0316	.0310	.0337	.0346	.0324	.0352	.0325
28	.0189	.0209	.0244	.0239	.0282	.0305	.0310	.0309	.0304	.0329	.0338	.0317	.0344
29	.0182	.0186	.0204	.0238	.0233	.0275	.0297	.0302	.0301	.0296	.0321	.0329	.0309
30	.0186	.0180	.0184	.0202	.0235	.0231	.0271	.0293	.0298	.0297	.0292	.0316	.0325
31	.0165	.0163	.0177	.0181	.0198	.0235	.0226	.0265	.0266	.0290	.0290	.0285	.0306
32	.0175	.0162	.0175	.0174	.0177	.0194	.0224	.0220	.0258	.0278	.0283	.0282	.0277
33	.0181	.0173	.0160	.0176	.0171	.0174	.0190	.0220	.0216	.0253	.0272	.0277	.0276
34	.0152	.0177	.0169	.0156	.0172	.0167	.0170	.0186	.0215	.0211	.0246	.0265	.0269
35	.0182	.0148	.0172	.0165	.0153	.0168	.0163	.0166	.0181	.0209	.0205	.0239	.0257
36	.0096	.0178	.0145	.0169	.0161	.0149	.0164	.0160	.0163	.0177	.0204	.0200	.0233
37	.0089	.0094	.0173	.0141	.0164	.0157	.0145	.0159	.0155	.0158	.0172	.0198	.0194
38	.0075	.0086	.0092	.0168	.0137	.0159	.0153	.0141	.0155	.0151	.0154	.0167	.0192
39	.0064	.0071	.0082	.0087	.0157	.0129	.0149	.0143	.0133	.0145	.0141	.0144	.0157
40	.0057	.0059	.0066	.0076	.0080	.0145	.0119	.0138	.0132	.0123	.0134	.0131	.0133
41	.0201	.0201	.0204	.0212	.0227	.0242	.0312	.0340	.0378	.0402	.0411	.0428	.0436

APPENDIX II.6.3 (CONT'D)

PROJECTED NUMBER OF ALL PUBLICATIONS AT A .0% GROWTHRATE

ROW	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990
MED	35647	35974	36181	36279	36284	36246	35942	35810	35640	35558	35547	35512	35522
SUR	13239	13240	13210	13124	13022	12875	12696	12502	12285	12064	11843	11620	11415
BEH	4176	4234	4221	4222	4210	4195	4159	4136	4107	4084	4074	4061	4056
HOS	13628	13657	13636	13556	13441	13255	13127	12975	12817	12656	12501	12339	12185
BAS	3570	3934	3885	3623	3760	3699	3629	3570	3512	3466	3429	3397	3371
ALL	70661	71010	71133	71005	70717	70310	69552	68993	68361	67831	67394	66930	66549

PERCENTAGE CHANGE FROM 1978

ROW	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990
MED	.9	1.5	1.8	1.8	1.7	.8	.5	-.0	-.2	-.3	-.4	-.4
SUR	.0	-.2	-.9	-1.6	-2.8	-4.1	-5.6	-7.2	-8.9	-10.5	-12.2	-13.8
BEH	.7	1.1	1.1	.8	.5	-.4	-1.0	-1.7	-2.2	-2.5	-2.7	-2.9
HOS	.2	.1	-.5	-1.4	-2.4	-3.7	-4.8	-6.0	-7.1	-8.3	-9.5	-10.6
BAS	-.9	-2.1	-3.7	-5.3	-6.8	-8.6	-10.1	-11.5	-12.7	-13.6	-14.4	-15.1
ALL	.5	.7	.5	.1	-.5	-1.6	-2.4	-3.3	-4.0	-4.6	-5.3	-5.8

PERCENTAGE CHANGE FROM PREVIOUS YEAR

ROW	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990
MED	.9	.6	.3	.0	-.1	-.8	-.4	-.5	-.2	-.0	-.1	.0
SUR	.0	-.2	-.6	-.8	-1.1	-1.4	-1.5	-1.7	-1.8	-1.8	-1.9	-1.8
BEH	.7	.4	.0	-.3	-.3	-.9	-.5	-.7	-.6	-.3	-.3	-.1
HOS	.2	-.2	-.6	-.6	-1.1	-1.3	-1.2	-1.2	-1.2	-1.2	-1.3	-1.3
BAS	-.9	-1.2	-1.6	-1.7	-1.6	-1.9	-1.6	-1.6	-1.3	-1.1	-.5	-.7
ALL	.5	.2	-.2	-.4	-.6	-1.1	-.8	-.9	-.6	-.6	-.7	-.6

PROJECTED NUMBER OF SPECIAL PUBLICATIONS AT A .0% GROWTHRATE

ROW	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990
MED	17549	17670	17750	17759	17717	17640	17455	17339	17217	17130	17077	17006	16964
SUR	2907	2875	2835	2786	2738	2692	2644	2595	2542	2491	2444	2397	2357
BEH	658	656	653	646	637	625	613	603	594	586	580	575	573
HOS	6229	6213	6172	6105	6039	5955	5863	5779	5693	5618	5537	5457	5363
BAS	2184	2162	2133	2098	2062	2030	1991	1959	1926	1903	1885	1868	1855
ALL	29528	29576	29543	29394	29192	28942	28566	28275	27974	27728	27523	27304	27132

PERCENTAGE CHANGE FROM 1978

ROW	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990
MED	.7	1.1	1.2	1.0	.5	-.5	-1.2	-1.9	-2.4	-2.7	-3.1	-3.3
SUR	-1.1	-2.5	-4.2	-5.8	-7.4	-9.0	-10.8	-12.6	-14.3	-15.9	-17.5	-18.9
BEH	-.3	-.9	-1.9	-3.3	-5.0	-6.9	-8.3	-9.8	-11.0	-11.9	-12.6	-13.0
HOS	-.3	-.9	-2.0	-3.1	-4.4	-5.9	-7.2	-8.6	-9.8	-11.1	-12.4	-13.6
BAS	-1.0	-2.3	-3.9	-5.6	-7.1	-8.8	-10.3	-11.7	-12.8	-13.7	-14.5	-15.0
ALL	.2	.1	-.5	-1.1	-2.0	-3.3	-4.2	-5.3	-6.1	-6.8	-7.5	-8.1

PERCENTAGE CHANGE FROM PREVIOUS YEAR

ROW	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990
MED	.7	.4	.1	-.2	-.4	-1.0	-.7	-.7	-.5	-.3	-.4	-.2
SUR	-1.1	-1.4	-1.7	-1.7	-1.7	-1.8	-1.9	-2.0	-2.0	-1.9	-1.9	-1.7
BEH	-.3	-.5	-1.0	-1.4	-1.8	-2.0	-1.6	-1.6	-1.3	-1.1	-.8	-.4
HOS	-.3	-.6	-1.1	-1.1	-1.4	-1.5	-1.4	-1.5	-1.3	-1.4	-1.4	-1.4
BAS	-1.0	-1.3	-1.6	-1.7	-1.6	-1.9	-1.6	-1.6	-1.3	-1.0	-.9	-.7
ALL	.2	-.1	-.5	-.7	-.9	-1.3	-1.0	-1.1	-.9	-.7	-.5	-.6

APPENDIX II.6.4

PUBLICATION PRODUCTIVITY AT .6 PERCENT DECREASE

PROJECTED NUMBER OF ALL PUBLICATIONS AT A -.6% GROWTHRATE

ROW	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990
MED	35647	35803	35816	35710	35501	35241	34911	34556	34162	33659	33130	32581	32020
SUR	13035	12972	12870	12699	12727	12497	12283	11951	11647	11337	11028	10718	10428
BEH	4176	4183	4176	4153	4114	4073	4010	3961	3905	3856	3820	3782	3752
HOS	13528	13584	13485	13323	13124	12883	12638	12399	12154	11909	11665	11418	11179
BAS	3970	3913	3835	3746	2655	3564	3470	3384	3299	3228	3167	3111	3067
ALL	70661	70645	70382	69841	69121	68271	67063	66051	64967	63880	62110	62210	61402

PERCENTAGE CHANGE FROM 1978

ROW	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990
MED	.4	.5	.2	-.4	-1.1	-2.6	-3.6	-4.7	-5.6	-6.2	-6.9	-7.5
SUR	-.5	-1.3	-2.5	-3.9	-5.6	-7.6	-9.7	-12.0	-14.4	-16.7	-19.0	-21.2
BEH	.2	-.0	-.6	-1.5	-2.5	-4.0	-5.2	-6.5	-7.7	-8.5	-9.4	-10.2
HOS	-.3	-1.1	-2.2	-3.7	-5.4	-7.3	-9.0	-10.8	-12.6	-14.4	-16.2	-18.0
BAS	-1.5	-3.4	-5.6	-7.9	-10.1	-12.6	-14.7	-16.9	-18.7	-20.2	-21.6	-22.8
ALL	-.0	-.4	-1.2	-2.2	-3.4	-5.1	-6.5	-8.1	-9.4	-10.7	-12.0	-13.1

PERCENTAGE CHANGE FROM PREVIOUS YEAR

ROW	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990
MED	.4	.0	-.3	-.6	-.7	-1.5	-1.0	-1.1	-.9	-.7	-.7	-.6
SUR	-.5	-.8	-1.2	-1.4	-1.8	-2.1	-2.3	-2.5	-2.7	-2.7	-2.8	-2.7
BEH	.2	-.2	-.5	-.5	-1.0	-1.6	-1.2	-1.4	-1.3	-.9	-1.0	-.8
HOS	-.3	-.7	-1.2	-1.5	-1.8	-2.0	-1.9	-2.0	-2.0	-2.0	-2.1	-2.1
BAS	-1.5	-1.9	-2.3	-2.4	-2.4	-2.7	-2.6	-2.5	-2.2	-2.1	-1.8	-1.5
ALL	-.0	-.4	-.8	-1.0	-1.2	-1.8	-1.5	-1.6	-1.5	-1.4	-1.4	-1.3

PROJECTED NUMBER OF SPECIAL PUBLICATIONS AT A -.6% GROWTHRATE

ROW	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990
MED	17549	17583	17567	17474	17324	17137	16940	16612	16378	16181	16020	15842	15696
SUR	2907	2857	2798	2730	2663	2598	2530	2461	2390	2320	2254	2189	2130
BEH	658	653	645	634	620	605	587	573	559	547	536	528	521
HOS	6225	6177	6099	5993	5887	5762	5630	5506	5380	5266	5145	5027	4914
BAS	2194	2142	2105	2055	2004	1956	1909	1856	1810	1772	1740	1710	1685
ALL	29528	29417	29214	28886	28438	28059	27601	27008	26517	26085	25695	25296	24947

PERCENTAGE CHANGE FROM 1978

ROW	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990
MED	.2	.1	-.4	-1.3	-2.3	-3.3	-5.3	-6.7	-7.8	-8.7	-9.7	-10.6
SUR	-1.7	-3.8	-6.1	-8.4	-10.7	-13.0	-15.3	-17.8	-20.2	-22.5	-24.7	-26.7
BEH	-.9	-2.0	-3.7	-5.8	-8.2	-10.8	-12.9	-15.1	-16.9	-18.5	-19.9	-20.8
HOS	-.4	-2.1	-3.8	-5.5	-7.5	-9.6	-11.6	-13.6	-15.5	-17.4	-19.3	-21.1
BAS	-1.7	-3.6	-5.9	-8.2	-10.4	-12.9	-15.0	-17.1	-19.0	-20.3	-21.7	-22.8
ALL	-.4	-1.1	-2.2	-3.5	-5.0	-6.9	-8.5	-10.2	-11.7	-13.0	-14.3	-15.5

PERCENTAGE CHANGE FROM PREVIOUS YEAR

ROW	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990
MED	.2	-.1	-.5	-.5	-1.1	-1.7	-1.4	-1.4	-1.2	-1.0	-1.1	-.9
SUR	-1.7	-2.1	-2.4	-2.5	-2.4	-2.4	-2.7	-2.9	-2.9	-2.8	-2.9	-2.7
BEH	-.9	-1.2	-1.7	-2.2	-2.5	-2.3	-2.4	-2.5	-2.2	-1.9	-1.6	-1.2
HOS	-.5	-1.3	-1.7	-1.8	-2.1	-2.3	-2.2	-2.3	-2.1	-2.1	-2.3	-2.2
BAS	-1.7	-2.0	-2.4	-2.5	-2.4	-2.8	-2.5	-2.5	-2.1	-1.9	-1.7	-1.5
ALL	-.4	-.7	-1.1	-1.3	-1.5	-2.0	-1.9	-1.8	-1.6	-1.5	-1.6	-1.4

III. ACCESSION AND ATTRITION OF MEDICAL SCHOOL FACULTY WHO ARE RECENT PHYSICIAN GRADUATES

A. Introduction

The objective of this chapter is to review a number of indicators in an effort to assess whether faculty careers for MD graduates are becoming more or less preferred. The several approaches to this assessment use data from: research grant applications from the National Institutes of Health; the AAMC Faculty Roster System and the Liaison Committee on Medical Education; and publications of the American Medical Association. From these sources information was developed which is presented in the following order:

- The first section provides an estimate of the number of MD graduates of the 1964-1973 classes who have applied or will apply to the National Institutes of Health or Alcohol, Drug Abuse and Mental Health Agency for research grant support (Exhibit III.1).

- The second section provides the number and percent of MD graduates of the 1967-1974 classes who accepted a faculty appointment at a U.S. medical school and the number of graduates of those classes who left U.S. medical school faculties. The annual accession and attrition figures for these faculty are presented, and the number and percent of these faculty who have engaged in research at the medical schools is also presented. The additional dimension of sex is provided for all

years, and for selected years separate data are provided for each of the principal ethnic groups.

- The third section presents trend data, as reported to the American Medical Association, on all physicians in the U.S. whose primary activity is research (Appendix III.22). This can be compared to Faculty Roster data on the number of MD faculty at U.S. medical schools who participate in research (spending at least 10 percent of their time in this activity). These data are presented for selected years in Appendix III.23.

The results of each of these approaches are discussed in the following text.

B. Estimate of Research Participation by MD Graduation Cohorts

Estimation of participation on medical school faculties by successive graduating cohorts of American physicians gives one indication of trends in the perceived attractiveness and opportunities in academic medicine. Estimation of participation in medical research by successive graduating cohorts may indicate a trend in the growth and application of new medical knowledge. Such information about successive cohorts would add a new perspective to the widely discussed decline in MD's among new Principal Investigators (PI's), both relative to other degree holders and in absolute numbers.*

*See, for example, Clinical Research Manpower, the Report of the ad hoc Committee on Clinical Research Training, Association of American Medical Colleges (February 1980), which contains references to other papers on the decline in MD investigators.

While more complete and current data are now becoming available, some data at hand, compiled for a recent study of educational influences on grant success,* permit an initial examination of the percentages of medical school graduation cohorts, from 1964 through 1973, who have applied to NIH for research support. As part of that study, all applicants to NIH or ADAMHA for new RØ1 grant support between 1968 and 1975 were matched by name and social security number with individual faculty member records on the AAMC Faculty Roster. The analysis was restricted to first applications by faculty members who earned MD's after 1963 or PhD's after 1965 (or both). As a result of the match, 765 MD's, 109 MD-PhD's, and 2,201 PhD's were identified and studied. Foreign MD's were not excluded. Unsuccessful first-grant applications were included. In Exhibit III.1, column A shows the numbers of matched MD's (including MD-PhD's) by year of graduation from medical school.

Column B of the exhibit shows the percentage of grant applicant cohort who would be expected to apply for a first grant between 1968 and 1975. The percentages are derived from a study by Douglass and James (Science, July 20, 1973) of the rate of entry of new principal investigators into the NIH research project grant system. They report an average interval of 11 years between medical school graduation and the beginning of a first research grant. The percentages in column B are interpolated from the entire distribution of elapsed-time-to-

* Sherman, C.R. and Morgan, T.E., Education Patterns and Research Grant Success of Medical School Faculty. Washington, D.C.: AAMC, January 1979.

application for 219 new MD PI's, provided to us directly by Dr. James for this analysis. The percentages are adjusted at each end for restriction of the years of graduation in our study population and for recency of the grant application file (latest application: 1975) used in the match. It should be noted that the intervals estimated by Douglass and James are time-to-application of a first successful grant application, while our population may include MD's who applied, were unsuccessful, and did not apply again.

Column C of Exhibit III.1 presents estimates of the number in each graduation cohort who will ever apply to NIH for a research grant. These estimates are derived by inflating the number of matched physicians in the cohort (column A) in two ways: first, by dividing the number applying (column A) by the expected fraction of those who will ever apply (column B); second, by dividing by .85 to account for incompleteness of the 1977 roster of faculty used to match with grant application records.

The total numbers of graduates of U.S. medical schools in each year from 1964 to 1975 are presented in column D. Finally, the ratio of columns C and D results in an estimate of the percentage of each graduation cohort who will ever apply for a research grant.

There appears to be a declining trend in research involvement of successive graduating classes of MD's, but several caveats must be offered. First, estimates for later years are based on very small numbers of matched faculty and are therefore less reliable than estimates

EXHIBIT III.1

ESTIMATION OF RESEARCH PARTICIPATION
BY SUCCESSIVE COHORTS OF GRADUATING MDs

Year of MD Grad.	A Number of Matched MDs or MD-PhDs	B* % Expected to Apply 1968-75	C* Est. No. in Cohort Who Will Ever Apply	D No. Grads. in Entire U.S. Cohort	E* Est. % of Grad. Cohort Applying for RØ1 Grant
1964	238	59.9	467	7,336	6.4
1965	219	50.7	508	7,409	6.9
1966	144	41.5	408	7,574	5.4
1967	122	35.9	400	7,743	5.2
1968	70	26.5	311	7,973	3.9
1969	48	17.2	329	8,059	4.1
1970	26	7.8	392	8,367	4.7
1971	11	6.2	208	8,974	2.3
1972	4	4.6	102	9,551	1.1
1973	3	4.2	85	10,391	.8
1974	0	3.7	--	11,613	--
1975	2	.0	--	12,714	--

* See text for derivation.

for earlier years. Second, the interpolated and end-adjusted percentages of expected applicants, column B, are very sensitive to the distribution of time-to-application after receipt of the MD degree. Third, column A includes an unknown number of foreign-educated MD's, while column D includes only U.S.-educated physicians.

The Consolidated Grant Applicant File, prepared by the National Research Council for NIH, is just recently available, and as it contains records of all applications (successful and unsuccessful) from 1938 to 1978 sorted by individual applicant, it could now be possible to derive more satisfactory estimates of physician-cohort participation in the NIH research grant system. The file does not, however, contain date or place of graduation or professional degree. The Applicant file, matched with the AAMC Faculty Roster or some other source of data and place of receipt of the MD degree, would permit a more reliable and longer-term estimate of the trend in physician-cohort participation in research.

C. U.S. Medical School Faculty Accession and Attrition for M.D. Graduating Classes

The M.D. graduating classes of 1967 through 1974 were the target years for the development of the following statistics. A series of tables (Exhibit III.2 through III.9) display the annual number and percent of each year's graduates who received an appointment at a medical school, the number and percent departing and the number and percent of those who have remained on the faculty through 1980. Exhibit III.11 and III.12 provide graphs and summary statistics to

EXHIBIT III. 2

Number and Percent Distribution of 1967 Medical Graduates Accepting Medical School Faculty Appointments; Terminating Faculty Appointments; and Balance Remaining on Faculty by Year 1967-1980

	Prior to Year of M.D.			1967			1968			1969			1970			1971			1972			1973		
Years since Graduation				0			1			2			3			4			5			6		
	Number	Percent of Class	Percent of Total Appointments	Number	Percent of Class	Percent of Total Appointments	Number	Percent of Class	Percent of Total Appointments	Number	Percent of Class	Percent of Total Appointments	Number	Percent of Class	Percent of Total Appointments	Number	Percent of Class	Percent of Total Appointments	Number	Percent of Class	Percent of Total Appointments	Number	Percent of Class	Percent of Total Appointments
First Appointments	6	0.08	0.45	3	0.04	0.23	12	0.15	0.91	6	0.08	0.45	59	0.76	4.46	145	1.87	10.95	169	2.18	12.76	287	3.71	21.68
Cumulative Appointments	*6*	*0.08*	*0.45*	*9*	*0.12*	*0.68*	*21*	*0.27*	*1.59*	*27*	*0.35*	*2.04*	*86*	*1.11*	*6.50*	*231*	*2.98*	*17.45*	*400*	*5.17*	*30.21*	*687*	*8.87*	*51.89*
Final Deactivations	0			0			0			2	0.03	0.15	1	0.01	0.08	16	0.21	1.21	30	0.39	2.27	40	0.52	3.02
Cumulative Deactivations	*0*			*0*			*0*			*2*	*0.03*	*0.15*	*3*	*0.04*	*0.23*	*19*	*0.25*	*1.44*	*49*	*0.63*	*3.70*	*89*	*1.15*	*6.72*
Balance	6	0.08	0.45	9	0.12	0.68	21	0.27	1.59	25	0.32	1.89	83	1.07	6.27	212	2.74	16.01	351	4.53	26.51	598	7.72	45.17

	1974			1975			1976			1977			1978			1979			1980*			Year Unknown		
Years since Graduation	7			8			9			10			11			12			13					
	Number	Percent of Class	Percent of Total Appointments	Number	Percent of Class	Percent of Total Appointments	Number	Percent of Class	Percent of Total Appointments	Number	Percent of Class	Percent of Total Appointments	Number	Percent of Class	Percent of Total Appointments	Number	Percent of Class	Percent of Total Appointments	Number	Percent of Class	Percent of Total Appointments	Number	Percent of Class	Percent of Total Appointments
First Appointments	273	3.53	20.62	182	2.35	13.75	77	0.99	5.82	40	0.52	3.02	19	0.25	1.44	17	0.22	1.28	14	0.18	1.06	15	0.19	1.13
Cumulative Appointments	*960*	*12.40*	*72.51*	*1142*	*14.75*	*86.25*	*1219*	*15.74*	*92.07*	*1259*	*16.26*	*95.09*	*1278*	*16.51*	*96.53*	*1295*	*16.72*	*97.81*	*1309*	*16.91*	*98.87*	*1324*	*17.10*	*100.00*
Final Deactivations	66	0.85	4.98	58	0.75	4.38	82	1.06	6.19	73	0.94	5.51	41	0.53	3.10	44	0.57	3.32	30	0.39	2.27	3	0.04	0.23
Cumulative Deactivations	*155*	*2.00*	*11.71*	*213*	*2.75*	*16.09*	*295*	*3.81*	*22.28*	*368*	*4.75*	*27.79*	*409*	*5.28*	*30.89*	*453*	*5.85*	*34.21*	*483*	*6.24*	*36.48*	*486*	*6.28*	*36.71*
Balance	805	10.40	60.80	929	12.00	70.17	924	11.93	69.79	891	11.51	67.30	869	11.22	65.63	842	10.87	63.59	826	10.67	62.39	838	10.82	63.29

EXHIBIT III. 3

Number and Percent Distribution of 1968 Medical Graduates Accepting Medical School Faculty Appointments; Terminating Faculty Appointments; and Balance Remaining on Faculty by Year 1968-80

	Prior to Year of M.D.			1968			1969			1970			1971			1972			1973			1974		
Years since Graduation				0			1			2			3			4			5			6		
	Number	Percent of Class	Percent of Total Appointments	Number	Percent of Class	Percent of Total Appointments	Number	Percent of Class	Percent of Total Appointments	Number	Percent of Class	Percent of Total Appointments	Number	Percent of Class	Percent of Total Appointments	Number	Percent of Class	Percent of Total Appointments	Number	Percent of Class	Percent of Total Appointments	Number	Percent of Class	Percent of Total Appointments
First Appointments	7	0.09	0.51	10	0.13	0.73	9	0.11	0.66	19	0.24	1.39	64	0.80	4.69	121	1.52	8.86	185	2.32	13.55	279	3.50	20.44
Cumulative Appointments	*7*	*0.09*	*0.51*	*17*	*0.21*	*1.25*	*26*	*0.33*	*1.90*	*45*	*0.56*	*3.30*	*109*	*1.37*	*7.99*	*230*	*2.88*	*16.85*	*415*	*5.21*	*30.40*	*694*	*8.70*	*50.84*
Final Deactivations	0			0			0			0			3	0.04	0.22	9	0.11	0.66	30	0.38	2.20	35	0.44	2.56
Cumulative Deactivations	*0*			*0*			*0*			*0*			*3*	*0.04*	*0.22*	*12*	*0.15*	*0.88*	*42*	*0.53*	*3.08*	*77*	*0.97*	*5.64*
Balance	7	0.09	0.51	17	0.21	1.25	26	0.33	1.90	45	0.56	3.30	106	1.33	7.77	218	2.73	15.97	373	4.68	27.33	617	7.74	45.20

	1975			1976			1977			1978			1979			1980*			Year Unknown		
Years since Graduation	7			8			9			10			11			12					
	Number	Percent of Class	Percent of Total Appointments	Number	Percent of Class	Percent of Total Appointments	Number	Percent of Class	Percent of Total Appointments	Number	Percent of Class	Percent of Total Appointments	Number	Percent of Class	Percent of Total Appointments	Number	Percent of Class	Percent of Total Appointments	Number	Percent of Class	Percent of Total Appointments
First Appointments	285	3.57	20.88	189	2.37	13.85	93	1.17	6.81	45	0.56	3.30	33	0.41	2.42	13	0.16	0.95	13	0.16	0.95
Cumulative Appointments	*979*	*12.28*	*71.72*	*1168*	*14.65*	*85.57*	*1261*	*15.82*	*92.38*	*1306*	*16.38*	*95.68*	*1339*	*16.79*	*98.10*	*1352*	*16.96*	*99.05*	*1365*	*17.12*	*100.0*
Final Deactivations	61	0.77	4.47	94	1.18	6.89	85	1.07	6.23	65	0.82	4.76	77	0.97	5.64	37	0.46	2.71	2	0.03	0.15
Cumulative Deactivations	*138*	*1.73*	*10.11*	*232*	*2.91*	*17.00*	*317*	*3.98*	*23.22*	*382*	*4.79*	*27.99*	*459*	*5.76*	*33.62*	*496*	*6.22*	*36.34*	*498*	*6.25*	*36.48*
Balance	841	10.55	61.61	936	11.74	68.57	944	11.84	69.15	924	11.59	67.69	880	11.04	64.47	856	10.74	62.71	867	10.87	63.52

EXHIBIT III.4

Number and Percent Distribution of 1969 Medical Graduates Accepting Medical School Faculty Appointments; Terminating Faculty Appointments; and Balance Remaining on Faculty by Year 1969-1980

	Prior to Year of M.D.			1969			1970			1971			1972			1973			1974			1975		
Years since Graduation				0			1			2			3			4			5			6		
	Number	Percent of Class	Percent of Total Appointments	Number	Percent of Class	Percent of Total Appointments	Number	Percent of Class	Percent of Total Appointments	Number	Percent of Class	Percent of Total Appointments	Number	Percent of Class	Percent of Total Appointments	Number	Percent of Class	Percent of Total Appointments	Number	Percent of Class	Percent of Total Appointments	Number	Percent of Class	Percent of Total Appointments
First Appointments	5	0.06	0.36	6	0.07	0.43	15	0.19	1.09	35	0.43	2.53	75	0.93	5.43	198	2.46	14.34	255	3.16	18.46	287	3.56	20.78
Cumulative Appointments	*5*	*0.06*	*0.36*	*11*	*0.14*	*0.80*	*26*	*0.32*	*1.88*	*61*	*0.76*	*4.42*	*136*	*1.69*	*9.85*	*334*	*4.14*	*24.19*	*589*	*7.31*	*42.65*	*876*	*10.87*	*63.43*
Final Deactivations	0			0			1	0.01	0.07	0			2	0.02	0.14	22	0.27	1.59	49	0.61	3.55	50	0.62	3.62
Cumulative Deactivations	*0*			*0*			*1*	*0.01*	*0.07*	*1*	*0.01*	*0.07*	*3*	*0.04*	*0.22*	*25*	*0.31*	*1.81*	*74*	*0.92*	*5.36*	*124*	*1.54*	*8.98*
Balance	5	0.06	0.36	11	0.14	0.80	25	0.31	1.81	60	0.74	4.34	133	1.65	9.63	309	3.83	22.38	515	6.39	37.29	752	9.33	54.45

	1976			1977			1978			1979			1980*			Year Unknown		
Years since Graduation	7			8			9			10			11					
	Number	Percent of Class	Percent of Total Appointments	Number	Percent of Class	Percent of Total Appointments	Number	Percent of Class	Percent of Total Appointments	Number	Percent of Class	Percent of Total Appointments	Number	Percent of Class	Percent of Total Appointments	Number	Percent of Class	Percent of Total Appointments
First Appointments	237	2.94	17.16	145	1.80	10.50	52	0.65	3.77	42	0.52	3.04	17	0.21	1.23	12	0.15	0.87
Cumulative Appointments	*1113*	*13.81*	*80.59*	*1258*	*15.61*	*91.09*	*1310*	*16.26*	*94.86*	*1352*	*16.78*	*97.90*	*1369*	*16.99*	*99.13*	*1381*	*17.14*	*100.0*
Final Deactivations	76	0.94	5.50	94	1.17	6.81	64	0.79	4.63	64	0.79	4.63	50	0.62	3.62	0		
Cumulative Deactivations	*200*	*2.48*	*14.48*	*294*	*3.64*	*21.29*	*358*	*4.44*	*25.92*	*422*	*5.24*	*30.56*	*472*	*5.86*	*34.18*	*472*	*5.86*	*34.18*
Balance	913	11.33	66.11	964	11.96	69.80	952	11.81	68.94	930	11.54	67.34	897	11.13	64.95	909	11.28	65.82

EXHIBIT III. 5

Number and Percent Distribution of 1970 Medical Graduates Accepting Medical School Faculty Appointments; Terminating Faculty Appointments; and Balance Remaining on Faculty by Year 1970-1980

	Prior to Year of M.D.			1970			1971			1972			1973			1974			1975			1976		
Years since Graduation				0			1			2			3			4			5			6		
	Number	Percent of Class	Percent of Total Appointments	Number	Percent of Class	Percent of Total Appointments	Number	Percent of Class	Percent of Total Appointments	Number	Percent of Class	Percent of Total Appointments	Number	Percent of Class	Percent of Total Appointments	Number	Percent of Class	Percent of Total Appointments	Number	Percent of Class	Percent of Total Appointments	Number	Percent of Class	Percent of Total Appointments
First Appointments	7	0.08	0.54	5	0.06	0.38	31	0.37	2.38	18	0.22	1.38	70	0.84	5.38	189	2.26	14.53	249	2.98	19.14	283	3.83	21.75
Cumulative Appointments	*7*	*0.08*	*0.54*	*12*	*0.14*	*0.92*	*43*	*0.51*	*3.31*	*61*	*0.73*	*4.69*	*131*	*1.57*	*10.07*	*320*	*3.82*	*24.60*	*569*	*6.80*	*43.74*	*852*	*10.18*	*65.49*
Final Deactivations	0			0			0			2	0.02	0.15	10	0.12	0.77	16	0.19	1.23	54	0.65	4.15	71	0.85	5.46
Cumulative Deactivations	*0*			*0*			*0*			*2*	*0.02*	*0.15*	*12*	*0.14*	*0.92*	*28*	*0.33*	*2.15*	*82*	*0.98*	*6.30*	*153*	*1.83*	*11.76*
Balance	7	0.08	0.54	12	0.14	0.92	43	0.51	3.31	59	0.71	4.53	119	1.42	9.15	292	3.49	22.44	487	5.82	37.43	699	8.35	53.73

	1977			1978			1979			1980*			Year Unknown		
Years since Graduation	7			8			9			10					
	Number	Percent of Class	Percent of Total Appointments	Number	Percent of Class	Percent of Total Appointments	Number	Percent of Class	Percent of Total Appointments	Number	Percent of Class	Percent of Total Appointments	Number	Percent of Class	Percent of Total Appointments
First Appointments	241	2.88	18.52	117	1.40	8.99	59	0.71	4.53	21	0.25	1.61	11	0.13	0.85
Cumulative Appointments	*1093*	*13.06*	*84.01*	*1210*	*14.46*	*93.01*	*1269*	*15.17*	*97.54*	*1290*	*15.42*	*99.15*	*1301*	*15.55*	*100.0*
Final Deactivations	92	1.10	7.07	66	0.79	5.07	75	0.90	5.76	36	0.43	2.77	0		
Cumulative Deactivations	*245*	*2.93*	*18.83*	*311*	*3.72*	*23.90*	*386*	*4.61*	*29.67*	*422*	*5.04*	*32.44*	*422*	*5.04*	*32.44*
Balance	848	10.14	65.18	899	10.74	69.10	883	10.55	67.87	868	10.37	66.72	879	10.51	67.56

EXHIBIT III. 6

Number and Percent Distribution of 1971 Medical Graduates Accepting Medical School Faculty Appointments; Terminating Faculty Appointments; and Balance Remaining on Faculty by Year 1971-1980

	Prior to Year of M.D.			1971			1972			1973			1974			1975			1976			1977		
Years since Graduation				0			1			2			3			4			5			6		
	Number	Percent of Class	Percent of Total Appointments	Number	Percent of Class	Percent of Total Appointments	Number	Percent of Class	Percent of Total Appointments	Number	Percent of Class	Percent of Total Appointments	Number	Percent of Class	Percent of Total Appointments	Number	Percent of Class	Percent of Total Appointments	Number	Percent of Class	Percent of Total Appointments	Number	Percent of Class	Percent of Total Appointments
First Appointments	9	0.10	0.67	37	0.41	2.77	22	0.25	1.65	32	0.36	2.40	102	1.14	7.64	229	2.55	17.15	302	3.37	22.62	252	2.81	18.88
Cumulative Appointments	*9*	*0.10*	*0.67*	*46*	*0.51*	*3.45*	*68*	*0.76*	*5.09*	*100*	*1.11*	*7.49*	*202*	*2.25*	*15.13*	*431*	*4.80*	*32.28*	*733*	*8.17*	*54.91*	*985*	*10.98*	*73.78*
Final Deactivations	0			1	0.01	0.07	1	0.01	0.07	16	0.18	1.20	16	0.18	1.20	26	0.29	1.95	73	0.81	5.47	67	0.75	5.02
Cumulative Deactivations	*0*			*1*	*0.01*	*0.07*	*2*	*0.02*	*0.15*	*18*	*0.20*	*1.35*	*34*	*0.38*	*2.55*	*60*	*0.67*	*4.49*	*133*	*1.48*	*9.96*	*200*	*2.23*	*14.98*
Balance	9	0.10	0.67	45	0.50	3.37	66	0.74	4.94	82	0.91	6.14	168	1.87	15.58	371	4.13	27.79	600	6.69	44.94	785	8.75	58.80

	1978			1979			1980*			Year Unknown		
Years since Graduation	7			8			9					
	Number	Percent of Class	Percent of Total Appointments	Number	Percent of Class	Percent of Total Appointments	Number	Percent of Class	Percent of Total Appointments	Number	Percent of Class	Percent of Total Appointments
First Appointments	192	2.14	14.38	104	1.16	7.79	44	0.49	3.30	10	0.11	0.75
Cumulative Appointments	*1177*	*13.12*	*88.16*	*1281*	*14.27*	*95.96*	*1325*	*14.76*	*99.25*	*1335*	*14.87*	*100.0*
Final Deactivations	89	0.99	6.67	73	0.81	5.47	46	0.51	3.45	0		
Cumulative Deactivations	*289*	*3.22*	*21.65*	*362*	*4.03*	*27.12*	*408*	*4.55*	*30.56*	*408*	*4.55*	*30.56*
Balance	888	9.90	66.52	919	10.24	68.84	917	10.22	68.69	927	10.33	69.44

EXHIBIT III. 7

Number and Percent Distribution of 1972 Medical Graduates Accepting Medical School Faculty Appointments; Terminating Faculty Appointments; and Balance Remaining on Faculty by Year 1972-1980

	Prior to Year of M.D.			1972			1973			1974			1975			1976			1977			1978		
Years since Graduation				0			1			2			3			4			5			6		
	Number	Percent of Class	Percent of Total Appointments	Number	Percent of Class	Percent of Total Appointments	Number	Percent of Class	Percent of Total Appointments	Number	Percent of Class	Percent of Total Appointments	Number	Percent of Class	Percent of Total Appointments	Number	Percent of Class	Percent of Total Appointments	Number	Percent of Class	Percent of Total Appointments	Number	Percent of Class	Percent of Total Appointments
First Appointments	9	0.09	0.66	30	0.31	2.19	12	0.13	0.88	32	0.34	2.34	191	2.00	13.94	297	3.11	21.68	366	3.83	26.72	203	2.13	14.82
Cumulative Appointments	*9*	*0.09*	*0.66*	*39*	*0.41*	*2.85*	*51*	*0.53*	*3.72*	*83*	*0.87*	*6.06*	*274*	*2.87*	*20.00*	*571*	*5.98*	*41.68*	*937*	*9.81*	*68.39*	*1140*	*11.94*	*83.21*
Final Deactivations	0			0			0			5	0.05	0.36	13	0.14	0.95	44	0.46	3.21	85	0.89	6.20	88	0.92	6.42
Cumulative Deactivations	*0*			*0*			*0*			*5*	*0.05*	*0.36*	*18*	*0.19*	*1.31*	*62*	*0.65*	*4.53*	*147*	*1.54*	*10.73*	*235*	*2.46*	*17.15*
Balance	9	0.09	0.66	39	0.41	2.85	51	0.53	3.72	78	0.82	5.69	256	2.68	18.69	509	5.33	37.15	790	8.27	57.66	905	9.48	66.06

	1979			1980*			Year Unknown		
Years since Graduation	7			8					
	Number	Percent of Class	Percent of Total Appointments	Number	Percent of Class	Percent of Total Appointments	Number	Percent of Class	Percent of Total Appointments
First Appointments	141	1.48	10.29	72	0.75	5.26	17	0.18	1.24
Cumulative Appointments	*1261*	*13.41*	*93.50*	*1333*	*14.17*	*98.76*	*1370*	*14.34*	*100.0*
Final Deactivations	91	0.95	6.64	51	0.53	3.72	0		
Cumulative Deactivations	*326*	*3.41*	*23.80*	*377*	*3.95*	*27.52*	*377*	*3.95*	*27.52*
Balance	955	10.00	69.71	976	10.22	71.24	993	10.40	72.48

EXHIBIT III. 8

Number and Percent Distribution of 1973 Medical Graduates Accepting Medical School Faculty Appointments; Terminating Faculty Appointments; and Balance Remaining on Faculty by Year 1972-1980

	Prior to Year of M.D.			1973			1974			1975			1976			1977			1978			1979		
Years since Graduation				0			1			2			3			4			5			6		
	Number	Percent of Class	Percent of Total Appointments	Number	Percent of Class	Percent of Total Appointments	Number	Percent of Class	Percent of Total Appointments	Number	Percent of Class	Percent of Total Appointments	Number	Percent of Class	Percent of Total Appointments	Number	Percent of Class	Percent of Total Appointments	Number	Percent of Class	Percent of Total Appointments	Number	Percent of Class	Percent of Total Appointments
First Appointments	14	0.13	1.12	24	0.23	1.91	18	0.17	1.44	34	0.33	2.71	186	1.79	14.83	312	3.00	24.88	321	3.09	25.60	229	2.20	18.26
Cumulative Appointments	*14*	*0.13*	*1.12*	*38*	*0.37*	*3.03*	*56*	*0.54*	*4.47*	*90*	*0.87*	*7.18*	*276*	*2.66*	*22.01*	*588*	*5.66*	*46.89*	*909*	*8.75*	*72.49*	*1138*	*10.95*	*90.75*
Final Deactivations	0			1	0.01	0.08	7	0.07	0.56	4	0.04	0.32	15	0.14	1.20	50	0.48	3.99	91	0.88	7.26	89	0.86	7.10
Cumulative Deactivations	*0*			*1*	*0.01*	*0.08*	*8*	*0.08*	*0.64*	*12*	*0.12*	*0.96*	*27*	*0.26*	*2.15*	*77*	*0.74*	*6.14*	*168*	*1.62*	*13.40*	*257*	*2.47*	*20.49*
Balance	14	0.13	1.12	37	0.36	2.95	48	0.46	3.83	78	0.75	6.22	249	2.40	19.86	511	4.92	40.75	741	7.13	59.09	881	8.48	70.26

	1980*			Year Unknown		
Years since Graduation	7					
	Number	Percent of Class	Percent of Total Appointments	Number	Percent of Class	Percent of Total Appointments
First Appointments	104	1.00	8.29	12	0.12	0.96
Cumulative Appointments	*1242*	*11.95*	*99.04*	*1254*	*12.07*	*100.0*
Final Deactivations	56	0.54	4.47	0		
Cumulative Deactivations	*313*	*3.01*	*24.96*	*313*	*3.01*	*24.96*
Balance	929	8.94	74.08	941	9.06	75.04

EXHIBIT III. 9

Number and Percent Distribution of 1974 Medical Graduates Accepting Medical School Faculty Appointments; Terminating Faculty Appointments; and Balance Remaining on Faculty by Year 1974-1980

	Prior to Year of M.D.			1974			1975			1976			1977			1978			1979			1980*		
Years since Graduation				0			1			2			3			4			5			6		
	Number	Percent of Class	Percent of Total Appointments	Number	Percent of Class	Percent of Total Appointments	Number	Percent of Class	Percent of Total Appointments	Number	Percent of Class	Percent of Total Appointments	Number	Percent of Class	Percent of Total Appointments	Number	Percent of Class	Percent of Total Appointments	Number	Percent of Class	Percent of Total Appointments	Number	Percent of Class	Percent of Total Appointments
First Appointments	17	0.15	1.65	11	0.09	1.07	15	0.13	1.46	25	0.22	2.43	186	1.60	18.09	266	2.29	25.88	315	2.71	30.64	176	1.52	17.12
Cumulative Appointments	*17*	*0.15*	*1.65*	*28*	*0.24*	*2.72*	*43*	*0.37*	*4.18*	*68*	*0.59*	*6.61*	*254*	*2.19*	*24.71*	*520*	*4.48*	*50.58*	*835*	*7.19*	*81.23*	*1011*	*8.71*	*98.35*
Final Deactivations	0			1	0.01	0.10	0			5	0.04	.49	14	0.12	1.36	36	0.31	3.50	81	0.70	7.88	61	0.53	5.93
Cumulative Deactivations	*0*			*1*	*0.01*	*0.10*	*1*	*0.01*	*0.10*	*6*	*0.05*	*.58*	*20*	*0.17*	*1.95*	*56*	*0.48*	*5.44*	*137*	*1.18*	*13.33*	*198*	*1.70*	*19.26*
Balance	17	0.15	1.65	27	0.23	2.63	42	0.36	4.09	62	0.53	6.03	234	2.01	22.76	464	4.00	45.14	698	6.01	67.90	813	7.00	79.09

	Year Unknown		
Years since Graduation			
	Number	Percent of Class	Percent of Total Appointments
First Appointments	17	0.15	1.65
Cumulative Appointments	*1096*	*8.85*	*100.00*
Final Deactivations	0		
Cumulative Deactivations	*198*	*1.70*	*19.26*
Balance	830	7.15	80.74

assist in comparing the different patterns of the graduating classes.

For each of these classes separate tables to display the information by the sex of the graduate were also developed. For more recent graduating classes, it was also possible to further refine the data by ethnic group - Black, Asian, and Caucasian (Appendix III.17 through III.29). The other ethnic groups contained too few M.D. graduates receiving a faculty appointment for meaningful comparison.

1. Total M.D. Graduates Faculty Accession and Attrition

Exhibit III.10 shows that the median number of years for all physicians between graduation and a first faculty appointment, for all physicians who ever receive faculty appointments, is between six and seven years. For the target years of this study, Exhibit III.11 and Exhibit III.12 display the percent of the specific graduating classes acceeding to faculty positions at yearly intervals following graduation. This data shows that in the early years after graduation there are very definite differences in appointment rates of different graduating classes. The class of 1972 appears academically oriented, since 9.8 percent of those physicians were appointed to medical school faculties within five years of graduation. This is nearly twice the rate of the class of 1967 (5.2 percent) and substantially higher than the class of 1974 (7.2 percent).

As the class matures, these differences diminish, suggesting that the ultimate outcome is not very different from class to class. If we consider appointments within seven years of graduation, the figures are 13.4 percent for 1972 and 12.4 percent for 1967, a difference not

Exhibit III.10

CUMULATIVE PERCENT OF FULL-TIME NEW HIRE M.D. AND M.D./Ph.D. FACULTY BY YEARS SINCE RECEIVING M.D. DEGREE

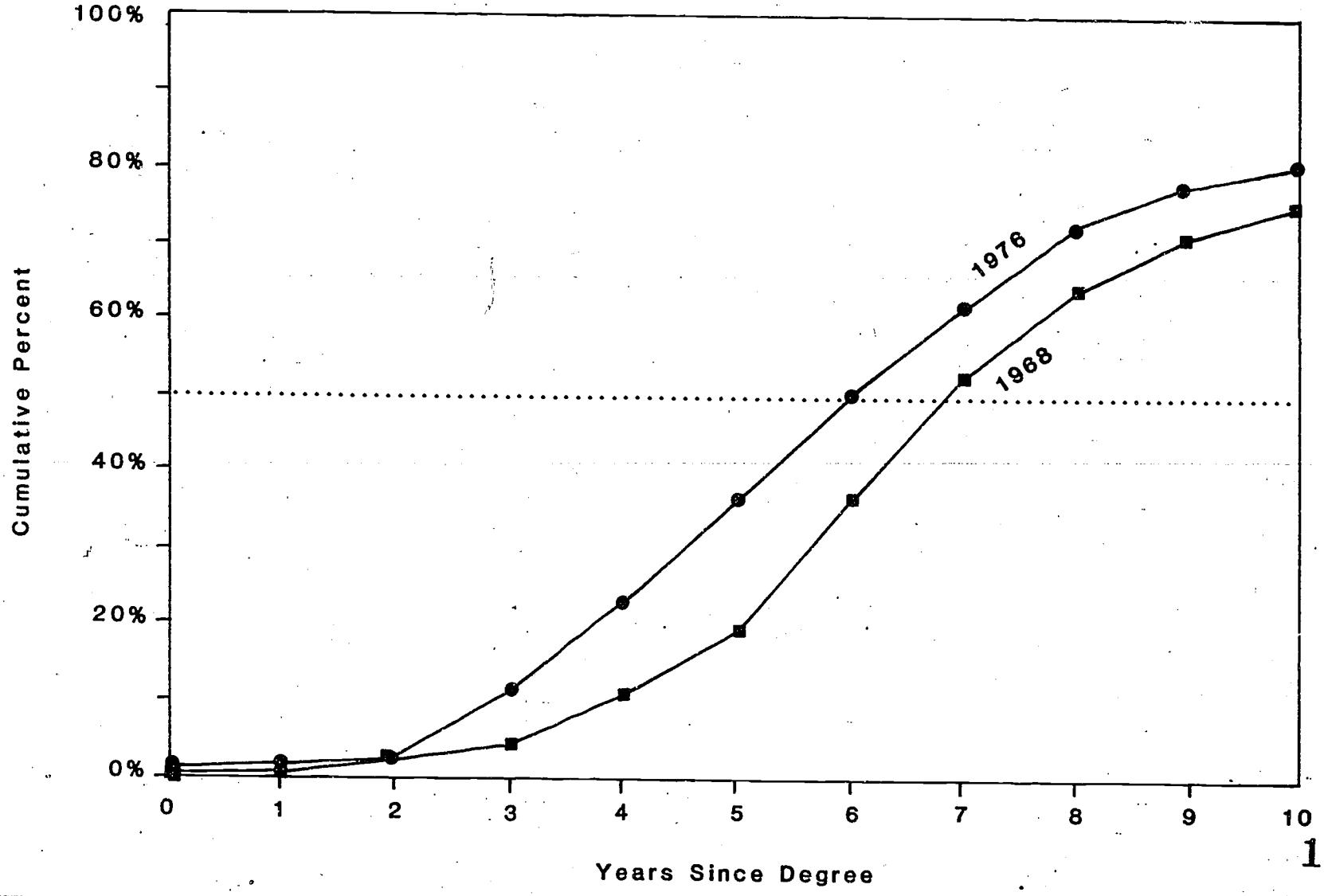


EXHIBIT III.11

PERCENT OF MEDICAL SCHOOL GRADUATING CLASS RECEIVING FACULTY APPOINTMENTS WITHIN N YEARS

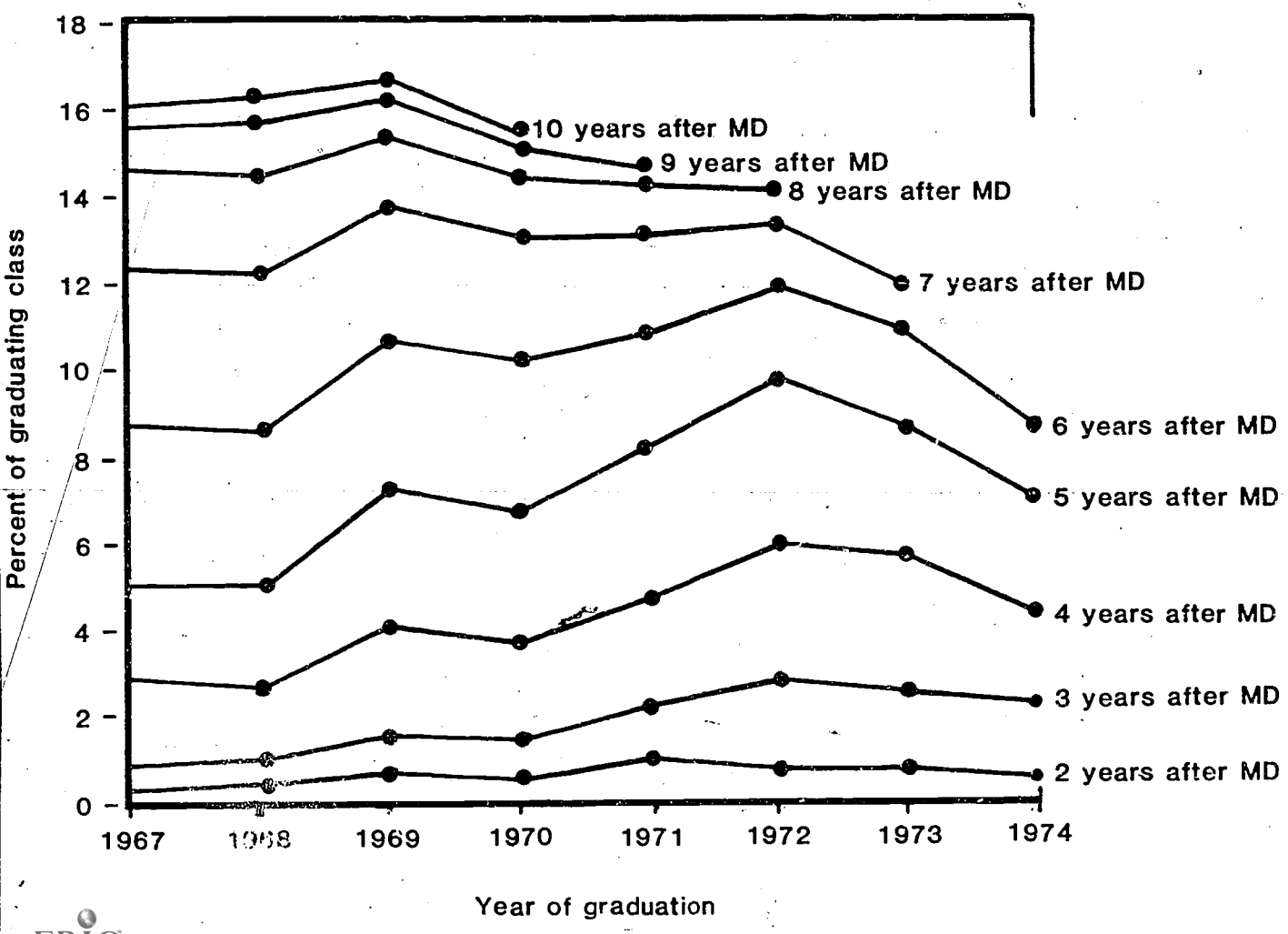


EXHIBIT III. 12

PERCENT OF MEDICAL GRADUATING CLASS

RECEIVING FACULTY APPOINTMENTS

	Years Following Graduation								
	2	3	4	5	6	7	8	9	10
Graduation Year	% of Class	% of Class	% of Class	% of Class	% of Class	% of Class	% of Class	% of Class	% of Class
1967	0.35	1.11	2.98	5.17	8.87	12.40	14.75	15.74	16.26
1968	0.48	1.23	2.88	5.21	8.70	12.28	14.65	15.82	16.38
1969	0.93	1.69	4.14	7.31	10.87	13.81	15.61	16.26	16.78
1970	0.73	1.57	3.82	6.80	10.18	13.06	14.46	15.17	15.42
1971	1.11	2.25	4.80	8.17	10.98	13.12	14.27	14.76	---
1972	0.87	2.87	5.98	9.81	11.94	13.41	14.17	---	---
1973	0.87	2.66	5.66	8.75	10.95	11.95	---	---	---
1974	0.59	2.19	4.48	7.19	8.71	---	---	---	---

nearly so striking. It appears that faculty careers were delayed for the class of 1967 relative to the class of 1972, perhaps because of the greater training opportunities or the requirements of the doctor draft (terminated in 1973).

Exhibit III.11 also shows that the higher faculty accession rates of the early seventies were foreshadowed by appointment rates as few as two years after receipt of the M.D. Thus, those statistics may be used as early warnings of a decline in interest or ability to secure faculty positions.

2. Male/Female Faculty Accession and Attrition

Appendix III.1 through III.16 display the male and female composition of the graduates who received faculty appointments. Although for all years the number of females joining the faculty is substantially lower than the number of males, a greater proportion of the female graduates receive a faculty appointment. The following (Exhibit III.13) displays the cumulative number and percent of the male/female graduates who received a faculty appointment. It is apparent from this table that a higher cumulative percentage of the female graduates receive faculty appointments for every year. For the four classes for which ten years have elapsed, over 55 percent of the females who had received a faculty appointment within the 10 years did so within five years of graduation, as compared to 40 percent or less of the male graduates.

The difference is even more striking in light of the fact that the female graduates not only join the faculty earlier but their attrition

EXHIBIT III.13

CUMULATIVE NUMBER AND PERCENT OF MALE/FEMALE GRADUATES RECEIVING FACULTY APPOINTMENTS BY CLASS YEAR

Faculty Appointments in Years Following Graduation

Year of Graduation	2				3				4				5				6			
	Male		Female		Male		Female		Male		Female		Male		Female		Male		Female	
	#	%	#	%	#	%	#	%	#	%	#	%	#	%	#	%	#	%	#	%
19[illegible]	23	0.3	4	0.7	66	0.9	20	3.4	182	2.5	49	8.4	315	4.4	85	14.6	581	8.1	106	18.2
1968	35	0.4	10	1.6	90	1.2	19	3.0	182	2.4	48	7.5	319	4.3	95	14.8	579	7.9	114	17.8
1969	57	0.7	4	0.7	117	1.5	19	3.1	293	3.9	41	6.8	519	6.9	70	11.5	786	10.5	90	14.8
1970	55	0.7	6	0.9	113	1.4	18	2.6	254	3.3	66	9.4	456	5.9	113	16.1	716	9.5	136	19.4
1971	92	1.1	8	1.0	174	2.1	28	3.4	343	4.2	87	10.5	596	7.3	136	16.4	819	10.0	165	20.0
1972	77	0.8	6	0.7	232	2.6	42	4.9	478	5.5	93	10.8	800	9.2	136	15.8	984	11.3	155	18.0
1973	82	0.8	8	0.9	242	2.5	34	3.7	516	5.4	72	7.8	800	8.4	108	11.7	1,006	10.6	131	14.2
1974	55	0.5	13	1.0	212	2.0	42	3.4	427	4.1	92	7.4	705	6.8	129	10.4	863	8.3	146	11.7

Faculty Appointments in Years Following Graduation

Year of Graduation	7				8				9				10			
	Male		Female		Male		Female		Male		Female		Male		Female	
	#	%	#	%	#	%	#	%	#	%	#	%	#	%	#	%
1967	839	11.7	121	20.8	1,016	14.1	126	21.6	1,091	15.2	128	22.0	1,128	15.7	131	22.5
1968	848	11.5	130	20.3	1,030	14.0	137	21.4	1,119	15.2	141	22.0	1,157	15.7	148	23.1
1969	1,013	13.5	100	16.5	1,148	15.4	110	18.1	1,195	16.0	115	18.9	1,233	16.5	119	19.6
1970	945	12.3	147	21.0	1,059	13.8	150	21.4	1,113	14.5	155	22.1	1,132	14.7	157	22.4
1971	1,000	12.2	176	21.3	1,095	13.4	185	22.4	1,135	13.9	189	22.9	---	---	---	---
1972	1,110	12.7	168	19.5	1,178	13.5	172	20.0	---	---	---	---	---	---	---	---
1973	1,103	11.6	138	14.2	---	---	---	---	---	---	---	---	---	---	---	---
1974	----	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---

EXHIBIT III. 14

CUMULATIVE NUMBER OF M.D.'s WHO RECEIVED FACULTY APPOINTMENTS

BY MALE, FEMALE, AND PERCENT FEMALE

Years Following Graduation

	6				7				8				9				10			
Yr. of Grad.	Total Appts.	M	F	%F	Total Appts.	M	F	%F	Total Appts.	M	F	%F	Total Appts.	M	F	%F	Total Appts.	M	F	%F
1967	687	581	106	15.4	960	839	121	12.6	1,142	1,016	126	11.0	1,219	1,019	128	10.5	1,259	1,128	131	10.4
1968	694	579	114	16.4	979	848	130	13.2	1,168	1,030	137	11.7	1,261	1,119	141	11.1	1,306	1,157	148	11.3
1969	876	786	90	10.2	1,113	1,013	100	8.9	1,258	1,148	110	8.7	1,310	1,195	115	8.7	1,352	1,233	119	8.8
1970	852	716	136	15.9	1,093	945	147	13.4	1,210	1,059	150	12.3	1,269	1,113	155	12.2	1,290	1,132	157	12.1
1971	985	819	165	16.7	1,177	1,000	176	14.9	1,281	1,095	185	14.4	1,325	1,135	189	14.2	---	---	---	---
1972	1,140	984	155	13.5	1,281	1,110	168	13.1	1,353	1,178	172	12.7	---	---	---	---	---	---	---	---
1973	1,138	1,006	131	11.5	1,242	1,103	138	11.1	---	---	---	---	---	---	---	---	---	---	---	---
1974	1,011	863	146	14.4	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---

EXHIBIT III.15

DEACTIVATION RATE OF MALE/FEMALE FACULTY OF THE 1967-1974 GRADUATING CLASSES

Years Following Graduation

Year of Graduation	3		4		5		6		7		8		9		10	
	M Rate	F %	M Rate	F %	M Rate	F %	M Rate	F %	M Rate	F %	M Rate	F %	M Rate	F %	M Rate	F %
1967	4.7	0	23.8	5.0	15.8	8.3	12.9	6.2	11.7	7.2	7.8	2.9	9.1	6.6	9.5	10.8
1968	5.7	10.0	9.0	5.5	14.5	10.8	10.9	4.5	9.5	10.6	11.8	6.4	8.1	8.3	6.8	6.7
1969	3.5	0	18.4	5.2	16.3	12.5	9.7	9.3	10.5	6.4	10.2	10.8	6.9	3.5	7.0	3.4
1970	16.9	16.6	14.7	5.8	19.7	14.0	14.2	15.6	13.5	11.0	8.1	5.5	8.3	8.5		
1971	20.7	0	18.1	0	20.9	15.4	11.6	9.1	12.0	7.3	8.1	8.6	4.9	5.1	---	---
1972	16.4	20.0	16.6	20.0	17.6	12.0	11.5	8.6	10.3	8.0	5.4	4.6	---	---	---	---
1973	21.4	0	21.3	11.7	18.9	10.2	12.5	8.2	5.8	9.8	---	---	---	---	---	---
1974	22.0	25.0	14.2	21.0	18.0	15.0	8.7	8.5	---	---	---	---	---	---	---	---
Average Rate	13.9	9.0	17.0	9.3	17.7	12.2	11.5	8.7	10.5	8.7	8.6	6.3	7.6	6.4	6.3	5.9

Exhibit III.16

PERCENT OF CLASS REMAINING ON FACULTY

AFTER FIVE TO EIGHT YEARS

Number of Years Following Graduation	1967	1968	1969	1970	1971	1972	1973	1974
Five Years	4.53	4.68	6.39	5.82	6.69	8.27	7.13	6.01
Six Years	7.72	7.74	9.33	8.35	8.75	9.48	8.48	7.00
Seven Years	10.40	10.55	11.33	10.14	9.90	10.00	8.94	--
Eight Years	12.00	11.74	11.96	10.74	10.24	10.22	--	--

rate is less than the males in each of the years studied (Exhibit III.15).

In order to place the percentage of female faculty in context, Exhibit III.14 provides the total number of graduates who received a faculty appointment within six to 10 years after graduation for the males and females and the percent of the total faculty that is female. The class of 1971 has the largest fraction of females receiving appointments at the 6th, 7th and 8th year intervals.

The attrition rate of the faculty from the graduating classes in this study are shown in Exhibit III.15. The annual rate of deactivation of male and female faculty for all of these classes is presented by number of years since graduation. The rate of attrition of the male faculty is substantially higher for each of the years than for their female counterparts.

The fraction of the graduating class remaining on the faculty after five to eight years is shown in Exhibit III.16. There appears to be a decline in the percent of graduates who remain faculty members after the seventh and eighth year.

3. Accession and Attrition of Black and Asian Ethnic Groups.

Exhibits III.17 and III.18 are summary tables of the black and the Asian graduates of the 1971-1974 classes receiving faculty appointments. Separate tables containing the accession and attrition data for these ethnic groups are contained in Appendix III.17 through III.29.

The number of black graduates from the 1973 and 1974 classes

EXHIBIT III.17

PERCENT OF BLACK MEDICAL GRADUATING CLASS RECEIVING FACULTY APPOINTMENTS

Graduation Year	Years Following Graduation																			
	1		2		3		4		5		6		7		8		9		10	
	Percent of Class	Number of Class	Percent of Class	Number of Class	Percent of Class	Number of Class	Percent of Class	Number of Class	Percent of Class	Number of Class	Percent of Class	Number of Class	Percent of Class	Number of Class	Percent of Class	Number of Class	Percent of Class	Number of Class	Percent of Class	Number of Class
1971	0.6	1	0.6	1	1.1	2	3.9	7	5.6	10	7.8	14	10.0	18	10.6	19	10.6	19	---	---
1972	---	---	---	---	1.3	3	3.5	8	5.7	13	6.1	14	6.1	14	6.6	15	---	---	---	---
1973	0.6	2	1.2	4	2.6	9	3.8	13	6.8	23	7.4	25	7.9	27	---	---	---	---	---	---
1974	0.6	3	0.6	3	1.8	9	3.5	18	4.3	22	4.5	24	---	---	---	---	---	---	---	---

EXHIBIT III.18

PERCENT OF ASIAN MEDICAL GRADUATING CLASS RECEIVING FACULTY APPOINTMENTS

Graduation Year	Years Following Graduation																			
	1		2		3		4		5		6		7		8		9		10	
	Percent of Class	Number of Class	Percent of Class	Number of Class	Percent of Class	Number of Class	Percent of Class	Number of Class	Percent of Class	Number of Class	Percent of Class	Number of Class	Percent of Class	Number of Class	Percent of Class	Number of Class	Percent of Class	Number of Class	Percent of Class	Number of Class
1971	0.8	1	1.6	2	4.8	6	9.7	12	15.3	19	17.7	22	18.5	23	18.5	23	18.5	23	---	---
1972	0.8	1	0.8	1	3.2	4	6.4	8	9.6	12	9.6	12	11.2	14	11.2	14	---	---	---	---
1973	0.8	1	1.6	2	2.4	3	4.8	6	6.5	8	8.1	10	8.9	11	---	---	---	---	---	---
1974	1.7	3	3.3	6	5.6	10	8.3	15	10.0	18	11.1	20	---	---	---	---	---	---	---	---

that have received a faculty appointment within five years has more than doubled compared to the class of 1971 (180 in 1971 and 511 in 1974). However, as a percent of their total number in the graduating class there is a noticeable decline (Exhibits III.17 and III.24).

The percent of Asian graduates of the 1972 through 1974 classes receiving a faculty appointment is less than for the 1971 class, although there are a greater number of M.D. graduates in that ethnic group in these later class years.

4. Research Involvement of the Faculty

Exhibits III.19 and III.20 display the percent of the total M.D. graduates who became faculty, currently active or inactive, and who engaged in research at a medical school. The involvement in research is defined as research being at least one responsibility of the faculty member. To determine the number and percent involvement for each of the classes, both the active and inactive faculty need to be considered. Exhibit III.21 is a summary table which includes data for the percent of research involvement of the graduates who have ever belonged to a medical school faculty. By 1980, M.D. faculty from the 1967 class who were involved in research accounted for 59.6 percent of those current or former faculty members, whereas by 1980 current or former M.D. faculty from the 1974 class involved in research accounted for 52.9 percent.

The data for the 1967 class encompasses 13 years since the graduating year, allowing a greater opportunity for a faculty appointment

EXHIBIT III.19

Medical Active Faculty by Class Year 1957-1976
by the Number and Percent Involved in Research Activities

LEVEL OF RESEARCH ACTIVITY	M.D.'s BY CLASS YEAR																	
	1957		1958		1959		1960		1961		1962		1963		1964		1965		1966	
	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent
Research as Primary Responsibility	29	4.6	18	2.8	27	4.0	33	4.5	27	3.8	33	4.2	30	4.0	33	4.7	35	4.2	39	4.7
Research as One Responsibility	395	63.3	392	61.2	449	66.5	437	60.1	439	61.5	498	63.0	452	60.9	433	62.2	507	60.6	477	57.7
Not Engaged In Research	179	28.7	214	33.4	183	27.1	229	31.5	219	30.7	233	29.5	233	31.4	201	28.9	250	29.9	272	32.9
No Information	21	3.4	16	2.5	16	2.4	28	3.9	29	4.1	26	3.3	27	3.6	29	4.2	44	5.3	38	4.6
TOTAL M.D.'s FROM CLASS	624	100.0	640	100.0	675	100.0	727	100.0	714	100.0	790	100.0	742	100.0	696	100.0	836	100.0	826	100.0

LEVEL OF RESEARCH ACTIVITY	M.D.'s BY CLASS YEAR																	
	1967		1968		1969		1970		1971		1972		1973		1974		1975		1976	
	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent
Research as Primary Responsibility	43	5.1	47	5.4	54	5.9	51	5.8	53	5.7	52	5.2	45	4.8	28	3.4	20	3.3	14	3.9
Research as One Responsibility	496	59.2	485	55.9	528	58.0	483	54.9	512	55.2	575	57.9	531	56.4	437	52.7	279	45.4	145	40.4
Not Engaged In Research	261	31.1	287	33.1	276	30.3	309	35.2	331	35.7	335	33.7	331	35.2	333	40.1	289	47.0	192	53.5
No Information	38	4.5	48	5.5	52	5.7	36	4.1	31	3.3	31	3.1	34	3.6	32	3.9	27	4.4	8	2.2
TOTAL M.D.'s FROM CLASS	838	100.0	867	100.0	910	100.0	879	100.0	927	100.0	993	100.0	941	100.0	830	100.0	615	100.0	359	100.0

EXHIBIT III.20

Medical Inactive Faculty by Class Year 1957-1976
by the Number and Percent Involved in Research Activities

LEVEL OF RESEARCH ACTIVITY	M.D.'s BY CLASS YEAR																	
	1957		1958		1959		1960		1961		1962		1973		1964		1965		1966	
	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent
Research as Primary Responsibility	4	1.5	8	2.7	5	1.5	13	3.7	6	1.5	9	2.0	8	1.6	11	2.2	14	2.8	13	2.4
Research as One Responsibility	123	46.1	145	49.0	160	49.2	152	42.7	187	47.8	218	47.7	235	46.5	260	52.2	233	47.1	271	49.9
Not Engaged In Research	94	35.2	87	29.4	90	27.7	121	34.0	130	33.2	146	31.9	196	38.8	176	35.3	202	40.8	223	41.1
No Information	46	17.2	56	18.9	70	21.5	70	19.7	68	17.4	84	18.4	66	13.1	51	10.2	46	9.3	36	6.6
TOTAL M.D.'s FROM CLASS	267	100.0	296	100.0	325	100.0	356	100.0	391	100.0	457	100.0	505	100.0	498	100.0	495	100.0	543	100.0

LEVEL OF RESEARCH ACTIVITY	M.D.'s BY CLASS YEAR																	
	1967		1968		1969		1970		1971		1972		1973		1974		1975		1976	
	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent
Research as Primary Responsibility	9	1.9	15	3.0	10	2.1	15	3.6	9	2.2	10	2.7	9	2.9	2	1.0	2	1.4	0	0.0
Research as One Responsibility	242	49.8	250	50.2	222	47.0	201	47.6	191	46.8	161	42.7	127	40.6	77	38.9	46	31.3	16	28.6
Not Engaged In Research	216	44.4	209	42.0	219	46.4	189	44.8	200	49.0	192	50.9	168	53.7	110	55.6	92	62.6	39	69.6
No Information	19	3.9	24	4.8	21	4.4	17	4.0	8	2.0	14	3.7	9	2.9	9	4.5	7	4.8	1	1.8
TOT TOTAL M.D.'s FROM CLASS	486	100.0	498	100.0	472	100.0	422	100.0	408	100.0	377	100.0	313	100.0	198	100.0	147	100.0	56	100.0

EXHIBIT III.21

PROPORTION OF 1967-74 M.D. GRADUATES RECEIVING A U.S. MEDICAL SCHOOL FACULTY APPOINTMENT BY 1980 AND THE PROPORTION OF THE 1967-74 M.D. GRADUATES WHO APPLIED FOR NIH RESEARCH GRANTS BY 1975

	1967	1968	1969	1970	1971	1972	1973	1974
Size of M.D. Graduating Class	7743	7973	8059	8367	8974	9551	10391	11613
Number Receiving Faculty Appointment	1324	1365	1382	1301	1335	1370	1254	1028
Number Involved in Research	790	797	814	750	765	798	712	544
Percent Involved in Research	59.6	58.3	58.9	57.6	57.3	58.2	56.7	52.9

than for the class of a later year. For a more useful comparison of these faculty cohorts, it would be necessary to compute the number of faculty with research involvement at a specific maturity, such as five years after graduation. This would require a faculty responsibility history, which is not maintained by the Faculty Roster. Such an analysis was not within the scope of this contract.

The number of M.D. graduates of the 1967-1974 classes that received a medical school appointment in comparison to the total size of the classes is shown in Exhibit III.21. Due to graduate medical education following the M.D. degree, M.D. graduates who accept faculty positions typically receive an appointment at a medical school six to seven years following the M.D. degree, and applications for research grants are filed one to seven years after that. In this study no class had the opportunity for the full maturation period. An analysis could be prepared based on a current grant application data base.

D. Total U.S. Physician Research Activity

Exhibit III.22 provides figures from the American Medical Association (AMA) for the number and percent of all M.D.'s in the United States whose primary activity is research and for those whose primary activity is teaching for the years 1970 through 1978.

The figures for M.D.'s on the medical school faculty as reported to the Association of American Medical Colleges for 1974-75, 1975-76, and 1977-78 are presented in Exhibit III.23. These numbers and percents represent faculty who are primarily engaged in research or teaching

EXHIBIT III.22

NUMBER AND PERCENT OF M.D.'S IN THE U.S. WHOSE PRIMARY ACTIVITY IS RESEARCH OR TEACHING
1970-1978*

Activity of MD's	1970	1971	1972	1973	1974	1975	1976	1977	1978
Number Involved in Research Activity	11,929	10,898	9,290	8,332	8,159	7,994	8,514	9,786	11,437
Percent Involved in Research Activity	3.57	3.16	2.60	2.27	2.14	2.01	2.07	2.32	2.61
Number Involved in Teaching	5,588	5,844	5,636	6,183	6,464	6,445	6,935	6,673	7,025
Percent Involved in Teaching	1.67	1.69	1.58	1.69	1.70	1.64	1.69	1.58	1.61
TOTAL M.D.'s	334,028	344,823	356,534	366,379	379,748	393,742	409,446	421,278	437,486

* Physician Distribution and Medical Licensure in the U.S., 1978, American Medical Association, 1979.

EXHIBIT III.23

NUMBER AND PERCENT OF FULL-TIME M.D. FACULTY AT U.S. MEDICAL SCHOOLS WITH RESEARCH OR TEACHING ACTIVITY 1974-75, 1976-77, 1977-78*

Activity of MD's	1974-75	1976-77	1977-78
Number Involved in Research	14,187	14,244	14,970
Percent Involved in Research	58.5	63.8	61.6
Number Involved in Teaching	22,698	21,012	22,130
Percent Involved in Teaching	93.6	94.1	91.2
Total M.D. Faculty	24,262	22,321	24,274
TOTAL Full-Time Faculty	40,026	37,963	41,161

* Faculty reports 10-100% time in research or teaching activity.
Faculty Roster System, AAMC.

as well as those who are involved in research or teaching for more than 10 percent of their time. While the numbers are not comparable to the AMA data due to differing criteria for classification, the AAMC figures show a reflection of the decline in 1974-75 and subsequent increase in the more current years in research oriented physicians.

EXHIBIT III.24

NUMBER OF M.D. GRADUATES, AND THEIR SEX AND RACE, FROM U.S. MEDICAL SCHOOLS, 1967-1974

M.D. Class	Total in Class	Male		Female		Caucasian		Black		Asian		Other Unknown	
		#	%	#	%	#	%	#	%	#	%	#	%
1967	7743	7160	92.5	583	7.5	---	---	---	---	---	---	---	---
1968	7973	7332	92.0	641	8.0	---	---	---	---	---	---	---	---
1969	8059	7452	92.5	607	7.5	---	---	---	---	---	---	---	---
1970	8367	7667	91.6	700	8.4	---	---	---	---	---	---	---	---
1971	8974	8147	90.8	827	9.2	8368	93.2	180	2.0	124	1.4	302	3.4
1972	9551	8691	91.0	860	9.0	9022	94.5	229	2.4	125	1.3	175	1.8
1973	10391	9467	91.1	924	8.9	9687	93.2	340	3.3	124	1.2	240	2.3
1974	11613	10349	89.1	1264	10.9	10369	89.3	511	4.4	180	1.6	553	4.8

APPENDICES

III.1 - III.16
MALE/FEMALE COMPOSITION

III.17 - III.28
ETHNIC COMPOSITION

APPENDIX III.1

Number and Percent Distribution of 1967 Male Medical Graduates Accepting Medical School Faculty Appointments; Terminating Faculty Appointments; and Balance Remaining on Faculty by Year 1967-1980

	Prior to Year of M.D.			1967			1968			1969			1970			1971			1972			1973		
Years since Graduation				0			1			2			3			4			5			6		
	Number	Percent of Class	Percent of Total Appointments	Number	Percent of Class	Percent of Total Appointments	Number	Percent of Class	Percent of Total Appointments	Number	Percent of Class	Percent of Total Appointments	Number	Percent of Class	Percent of Total Appointments	Number	Percent of Class	Percent of Total Appointments	Number	Percent of Class	Percent of Total Appointments	Number	Percent of Class	Percent of Total Appointments
First Appointments	5	0.07	0.42	3	0.04	0.25	10	0.14	0.84	5	0.07	0.42	43	0.60	3.61	116	1.62	9.75	133	1.86	11.18	266	3.72	22.35
Cumulative Appointments	*5*	*0.07*	*0.42*	*8*	*0.11*	*0.67*	*18*	*0.25*	*1.51*	*23*	*0.32*	*1.93*	*66*	*0.92*	*5.55*	*182*	*2.54*	*15.29*	*315*	*4.40*	*26.47*	*581*	*8.11*	*48.82*
Final Deactivations	0			0			0			2	0.03	0.17	1	0.01	0.08	15	0.21	1.26	26	0.36	2.18	35	0.49	2.94
Cumulative Deactivations	*0*			*0*			*0*			*2*	*0.03*	*0.17*	*3*	*0.04*	*0.25*	*18*	*0.25*	*1.51*	*44*	*0.61*	*3.70*	*79*	*1.10*	*6.64*
Balance	5	0.07	.42	8	0.11	0.67	18	0.25	1.51	21	0.29	1.76	63	0.88	5.29	164	2.29	13.78	271	3.78	22.77	502	7.01	42.18

	1974			1975			1976			1977			1978			1979			1980*			Year Unknown		
Years since Graduation	7			8			9			10			11			12			13					
	Number	Percent of Class	Percent of Total Appointments	Number	Percent of Class	Percent of Total Appointments	Number	Percent of Class	Percent of Total Appointments	Number	Percent of Class	Percent of Total Appointments	Number	Percent of Class	Percent of Total Appointments	Number	Percent of Class	Percent of Total Appointments	Number	Percent of Class	Percent of Total Appointments	Number	Percent of Class	Percent of Total Appointments
First Appointments	258	3.60	21.68	177	2.47	14.87	75	1.05	6.30	37	0.52	3.11	18	0.25	1.51	17	0.24	1.43	13	0.18	1.09	14	0.20	1.18
Cumulative Appointments	*839*	*11.72*	*70.50*	*1016*	*14.19*	*85.38*	*1091*	*15.24*	*91.68*	*1128*	*15.75*	*94.79*	*1146*	*16.01*	*96.30*	*1163*	*16.24*	*97.73*	*1176*	*16.42*	*98.82*	*1190*	*16.62*	*100.00*
Final Deactivations	59	0.82	4.96	55	0.77	4.62	75	1.05	6.30	62	0.87	5.21	38	0.53	3.19	36	0.50	3.03	27	0.38	2.27	3	0.04	0.25
Cumulative Deactivations	*138*	*1.93*	*11.60*	*193*	*2.70*	*16.22*	*268*	*3.74*	*22.52*	*330*	*4.61*	*27.73*	*368*	*5.14*	*30.92*	*404*	*5.64*	*33.95*	*431*	*6.02*	*36.22*	*434*	*6.06*	*36.47*
Balance	701	9.79	58.91	823	11.49	69.16	823	11.49	69.16	798	11.15	67.06	778	10.87	65.38	759	10.60	63.78	745	10.41	62.61	756	10.56	63.53

APPENDIX III.2

Number and Percent Distribution of 1967 Female Medical Graduates Accepting Medical School Faculty Appointments; Terminating Faculty Appointments; and Balance Remaining on Faculty by Year 1967-1980

	Prior to Year of M.D.			1967			1968			1969			1970			1971			1972			1973		
Years since Graduation				0			1			2			3			4			5.			6		
	Number	Percent of Class	Percent of Total Appointments	Number	Percent of Class	Percent of Total Appointments	Number	Percent of Class	Percent of Total Appointments	Number	Percent of Class	Percent of Total Appointments	Number	Percent of Class	Percent of Total Appointments	Number	Percent of Class	Percent of Total Appointments	Number	Percent of Class	Percent of Total Appointments	Number	Percent of Class	Percent of Total Appointments
First Appointments	1	0.2	0.7	0			2	0.3	1.5	1	0.2	0.7	16	2.7	11.9	29	5.0	21.6	36	6.2	26.9	21	3.6	15.7
Cumulative Appointments	*1*	*0.2*	*0.7*	*1*	*0.2*	*0.7*	*3*	*0.5*	*2.2*	*4*	*0.7*	*3.0*	*20*	*3.4*	*14.9*	*49*	*8.4*	*36.6*	*85*	*14.6*	*63.4*	*106*	*18.2*	*79.1*
Final Deactivations	0			0			0			0			0			1	0.2	0.7	4	0.7	3.0	5	0.9	3.7
Cumulative Deactivations	*0*			*0*			*0*			*0*			*0*			*1*	*0.2*	*0.7*	*5*	*0.9*	*3.7*	*10*	*1.7*	*7.5*
Balance	1	0.2	0.7	1	0.2	0.7	3	0.5	2.2	4	0.7	3.0	20	3.4	14.9	48	8.2	35.8	80	13.7	59.7	96	16.5	71.6

	1974			1975			1976			1977			1978			1979			1980*			Year Unknown		
Years since Graduation	7			8			9			10			11			12			13					
	Number	Percent of Class	Percent of Total Appointments	Number	Percent of Class	Percent of Total Appointments	Number	Percent of Class	Percent of Total Appointments	Number	Percent of Class	Percent of Total Appointments	Number	Percent of Class	Percent of Total Appointments	Number	Percent of Class	Percent of Total Appointments	Number	Percent of Class	Percent of Total Appointments	Number	Percent of Class	Percent of Total Appointments
First Appointments	15	2.6	11.2	5	0.9	3.7	2	0.3	1.5	3	0.5	2.2	1	0.2	0.7	0			1	0.2	0.7	1	0.2	0.7
Cumulative Appointments	*121*	*20.8*	*90.3*	*126*	*21.6*	*94.0*	*128*	*22.0*	*95.5*	*131*	*22.5*	*97.8*	*132*	*22.6*	*98.5*	*132*	*22.6*	*98.5*	*133*	*22.8*	*99.3*	*134*	*23.0*	*100.00*
Final Deactivations	7	1.2	5.2	3	0.5	2.2	7	1.2	5.2	11	1.9	8.2	3	0.5	2.2	8	1.4	6.0	3	0.5	2.2	0		
Cumulative Deactivations	*17*	*2.9*	*12.7*	*20*	*3.4*	*14.9*	*27*	*4.6*	*20.1*	*38*	*6.5*	*28.4*	*41*	*7.0*	*30.6*	*49*	*8.4*	*36.6*	*52*	*8.9*	*38.8*	*52*	*8.9*	*38.8*
Balance	104	17.8	77.6	106	18.2	79.1	101	17.3	75.4	93	16.0	69.4	91	15.6	67.9	83	14.2	61.9	81	13.9	60.4	82	14.1	61.2

APPENDIX III.3

Number and Percent Distribution of 1968 Male Medical Graduates Accepting Medical School Faculty Appointments; Terminating Faculty Appointments; and Balance Remaining on Faculty by Year 1968-1980

	Prior to Year of M.D.			1968			1969			1970			1971			1972			1973			1974		
Years since Graduation				0			1			2			3			4			5			6		
	Number	Percent of Class	Percent of Total Appointments	Number	Percent of Class	Percent of Total Appointments	Number	Percent of Class	Percent of Total Appointments	Number	Percent of Class	Percent of Total Appointments	Number	Percent of Class	Percent of Total Appointments	Number	Percent of Class	Percent of Total Appointments	Number	Percent of Class	Percent of Total Appointments	Number	Percent of Class	Percent of Total Appointments
First Appointments	6	0.08	0.50	9	0.12	0.74	4	0.05	0.33	16	0.22	1.32	55	0.75	4.54	92	1.25	7.6	137	1.87	11.31	260	3.55	21.47
Cumulative Appointments	*6*	*0.08*	*0.50*	*15*	*0.20*	*1.24*	*19*	*0.26*	*1.57*	*35*	*0.48*	*2.89*	*90*	*1.23*	*7.43*	*182*	*2.48*	*15.03*	*319*	*4.35*	*26.34*	*579*	*7.90*	*47.81*
Final Deactivations	0			0			0			0			2	0.03	0.17	8	0.11	0.66	25	0.34	2.06	31	0.42	2.56
Cumulative Deactivations	*0*			*0*			*0*			*0*			*2*	*0.03*	*0.17*	*10*	*0.14*	*0.83*	*35*	*0.48*	*2.89*	*66*	*0.90*	*5.45*
Balance	6	0.08	0.50	15	0.20	1.24	19	0.26	1.57	35	0.48	2.89	88	1.20	7.27	172	2.35	14.20	284	3.87	23.45	513	7.00	42.36

	1975			1976			1977			1978			1979			1980*			Year Unknown		
Years since Graduation	7			8			9			10			11			12					
	Number	Percent of Class	Percent of Total Appointments	Number	Percent of Class	Percent of Total Appointments	Number	Percent of Class	Percent of Total Appointments	Number	Percent of Class	Percent of Total Appointments	Number	Percent of Class	Percent of Total Appointments	Number	Percent of Class	Percent of Total Appointments	Number	Percent of Class	Percent of Total Appointments
First Appointments	269	3.67	22.21	182	2.48	15.03	89	1.21	7.35	38	0.52	3.14	30	0.41	2.48	12	0.16	0.99	12	0.16	0.99
Cumulative Appointments	*848*	*11.57*	*70.02*	*1030*	*14.05*	*85.05*	*1119*	*15.26*	*92.40*	*1157*	*15.78*	*95.54*	*1187*	*16.19*	*98.02*	*1199*	*16.35*	*99.01*	*1211*	*16.52*	*100.00*
Final Deactivations	49	0.67	4.05	87	1.19	7.18	76	1.04	6.28	58	0.79	4.79	67	0.91	5.53	31	0.42	2.56	2	0.03	0.17
Cumulative Deactivations	*115*	*1.57*	*9.50*	*202*	*2.76*	*16.68*	*278*	*3.79*	*22.96*	*336*	*4.58*	*27.75*	*403*	*5.50*	*33.28*	*434*	*5.92*	*35.84*	*436*	*5.95*	*36.00*
Balance	733	10.00	60.53	828	11.29	68.37	841	11.47	69.45	821	11.20	67.80	784	10.69	64.74	765	10.43	63.17	775	10.57	64.00

APPENDIX III.4

Number and Percent Distribution of 1968 Female Medical Graduates Accepting Medical School Faculty Appointments; Terminating Faculty Appointments; and Balance Remaining on Faculty by Year 1968-1980

	Prior to Year of M.D.			1968			1969			1970			1971			1972			1973			1974		
Years since Graduation				0			1			2			3			4			5			6		
	Number	Percent of Class	Percent of Total Appointments	Number	Percent of Class	Percent of Total Appointments	Number	Percent of Class	Percent of Total Appointments	Number	Percent of Class	Percent of Total Appointments	Number	Percent of Class	Percent of Total Appointments	Number	Percent of Class	Percent of Total Appointments	Number	Percent of Class	Percent of Total Appointments	Number	Percent of Class	Percent of Total Appointments
First Appointments	1	0.2	0.7	1	0.2	0.7	5	0.8	3.3	3	0.5	2.0	9	1.4	5.9	29	4.5	19.1	47	7.3	30.9	19	3.0	12.5
Cumulative Appointments	*1*	*0.2*	*0.7*	*2*	*0.3*	*1.3*	*7*	*1.1*	*4.6*	*10*	*1.6*	*6.6*	*19*	*3.0*	*12.5*	*48*	*7.5*	*31.6*	*95*	*14.8*	*62.5*	*114*	*17.8*	*75.0*
Final Deactivations	0			0			0			0			1	0.2	0.7	1	0.2	0.7	5	0.8	3.3	4	0.6	2.6
Cumulative Deactivations	*0*			*0*			*0*			*0*			*1*	*0.2*	*0.7*	*2*	*0.3*	*1.3*	*7*	*1.1*	*4.6*	*11*	*1.7*	*7.2*
Balance	1	0.2	0.7	2	0.3	1.3	7	1.1	4.6	10	1.6	6.6	18	2.8	11.8	46	7.2	30.3	88	13.7	57.9	103	16.1	67.8

	1975			1976			1977			1978			1979			1980*			Year Unknown		
Years since Graduation	7			8			9			10			11			12					
	Number	Percent of Class	Percent of Total Appointments	Number	Percent of Class	Percent of Total Appointments	Number	Percent of Class	Percent of Total Appointments	Number	Percent of Class	Percent of Total Appointments	Number	Percent of Class	Percent of Total Appointments	Number	Percent of Class	Percent of Total Appointments	Number	Percent of Class	Percent of Total Appointments
First Appointments	15	2.5	10.5	7	1.1	4.6	4	0.6	2.6	7	1.1	4.6	3	0.5	2.0	0			1	0.2	0.7
Cumulative Appointments	*130*	*20.3*	*85.6*	*137*	*21.4*	*90.1*	*141*	*22.0*	*92.8*	*148*	*23.1*	*97.4*	*151*	*23.6*	*99.3*	*151*	*23.6*	*99.3*	*152*	*23.7*	*100.0*
Final Deactivations	11	1.7	7.2	7	1.1	4.6	9	1.4	5.9	7	1.1	4.6	10	1.6	6.6	6	0.9	3.9	0		
Cumulative Deactivations	*22*	*3.4*	*14.5*	*29*	*4.5*	*19.1*	*38*	*5.9*	*25.0*	*45*	*7.0*	*29.6*	*55*	*8.6*	*36.2*	*61*	*9.5*	*40.1*	*61*	*9.5*	*40.1*
Balance	108	16.8	71.1	108	16.8	71.1	103	16.1	67.8	103	16.1	67.8	96	15.0	63.2	90	14.0	59.2	91	14.2	59.9

APPENDIX III.5

Number and Percent Distribution of 1969 Male Medical Graduates Accepting Medical School Faculty Appointments; Terminating Faculty Appointments; and Balance Remaining on Faculty by Year 1969-1980

	Prior to Year of M.D.			1969			1970			1971			1972			1973			1974			1975		
Years since Graduation				0			1			2			3			4			5			6		
	Number	Percent of Class	Percent of Total Appointments	Number	Percent of Class	Percent of Total Appointments	Number	Percent of Class	Percent of Total Appointments	Number	Percent of Class	Percent of Total Appointments	Number	Percent of Class	Percent of Total Appointments	Number	Percent of Class	Percent of Total Appointments	Number	Percent of Class	Percent of Total Appointments	Number	Percent of Class	Percent of Total Appointments
First Appointments	5	0.07	0.40	6	0.08	0.48	14	0.19	1.11	32	0.43	2.54	60	0.81	4.77	176	2.36	13.98	226	3.03	17.95	267	3.58	21.21
Cumulative Appointments	*5*	*0.07*	*0.40*	*11*	*0.15*	*0.87*	*25*	*0.34*	*1.99*	*57*	*0.76*	*4.53*	*117*	*1.57*	*9.29*	*293*	*3.93*	*23.27*	*519*	*6.96*	*41.22*	*786*	*10.55*	*62.43*
Final Deactivations	0			0			1	0.01	0.08	0			2	0.03	0.16	21	0.28	1.67	44	0.59	3.49	44	0.59	3.49
Cumulative Deactivations	*0*			*0*			*1*	*0.01*	*0.08*	*1*	*0.01*	*0.08*	*3*	*0.04*	*0.24*	*24*	*0.32*	*1.91*	*68*	*0.91*	*5.40*	*112*	*1.50*	*8.90*
Balance	5	0.07	0.40	11	0.15	0.87	24	0.32	1.91	56	0.75	4.45	114	1.53	9.05	269	3.61	21.37	451	6.05	35.82	674	9.04	53.53

	1976			1977			1978			1979			1980*			Year Unknown		
Years since Graduation	7			8			9			10			11					
	Number	Percent of Class	Percent of Total Appointments	Number	Percent of Class	Percent of Total Appointments	Number	Percent of Class	Percent of Total Appointments	Number	Percent of Class	Percent of Total Appointments	Number	Percent of Class	Percent of Total Appointments	Number	Percent of Class	Percent of Total Appointments
First Appointments	227	3.05	18.03	135	1.81	10.72	47	0.63	3.73	38	0.51	3.02	16	0.21	0.81	10	0.13	0.79
Cumulative Appointments	*1013*	*13.59*	*80.46*	*1148*	*15.41*	*91.18*	*1195*	*16.04*	*94.92*	*1233*	*16.55*	*97.93*	*1249*	*16.76*	*99.21*	*1259*	*16.89*	*100.0*
Final Deactivations	71	0.95	5.64	85	1.14	6.75	61	0.82	4.85	61	0.82	4.85	45	0.60	3.57	0		
Cumulative Deactivations	*183*	*2.46*	*14.54*	*268*	*3.60*	*21.29*	*329*	*4.41*	*26.13*	*390*	*5.23*	*30.98*	*435*	*5.84*	*34.55*	*435*	*5.84*	*34.55*
Balance	830	11.14	65.93	880	11.81	69.90	866	11.62	68.78	843	11.31	66.96	814	10.92	64.65	824	11.06	65.45

APPENDIX III.6

Number and Percent Distribution of 1969 Female Medical Graduates Accepting Medical School Faculty Appointments; Terminating Faculty Appointments; and Balance Remaining on Faculty by Year 1969-1980

	Prior to Year of M.D.			1969			1970			1971			1972			1973			1974			1975		
Years since Graduation				0			1			2			3			4			5			6		
	Number	Percent of Class	Percent of Total Appointments	Number	Percent of Class	Percent of Total Appointments	Number	Percent of Class	Percent of Total Appointments	Number	Percent of Class	Percent of Total Appointments	Number	Percent of Class	Percent of Total Appointments	Number	Percent of Class	Percent of Total Appointments	Number	Percent of Class	Percent of Total Appointments	Number	Percent of Class	Percent of Total Appointments
First Appointments	0			0			1	0.2	0.8	3	0.5	2.5	15	2.5	12.3	22	3.6	18.0	29	4.8	23.8	20	3.3	16.4
Cumulative Appointments	*0*			*0*			*1*	*0.2*	*0.8*	*4*	*0.7*	*3.3*	*19*	*3.1*	*15.6*	*41*	*6.8*	*33.6*	*70*	*11.5*	*57.4*	*90*	*14.8*	*73.8*
Final Deactivations	0			0			0			0			0			1	0.2	0.8	5	0.8	4.1	6	1.0	4.9
Cumulative Deactivations	*0*			*0*			*0*			*0*			*0*			*1*	*0.2*	*0.8*	*6*	*1.0*	*4.9*	*12*	*2.0*	*9.8*
Balance	0			0			1	0.2	0.8	4	0.7	3.3	19	3.1	15.6	40	6.6	32.8	64	10.5	52.5	78	12.9	63.9

	1976			1977			1978			1979			1980*			Year Unknown		
Years since Graduation	7			8			9			10			11					
	Number	Percent of Class	Percent of Total Appointments	Number	Percent of Class	Percent of Total Appointments	Number	Percent of Class	Percent of Total Appointments	Number	Percent of Class	Percent of Total Appointments	Number	Percent of Class	Percent of Total Appointments	Number	Percent of Class	Percent of Total Appointments
First Appointments	10	1.6	8.2	10	1.6	8.2	5	0.8	4.1	4	0.7	3.3	1	0.2	0.8	2	0.3	1.6
Cumulative Appointments	*100*	*16.5*	*82.0*	*110*	*18.1*	*90.2*	*115*	*18.9*	*94.3*	*119*	*19.6*	*97.5*	*120*	*19.8*	*98.4*	*122*	*20.1*	*100.0*
Final Deactivations	5	0.8	4.1	9	1.5	7.4	3	0.5	2.5	3	0.5	2.5	5	0.8	4.1	0		
Cumulative Deactivations	*17*	*2.8*	*13.9*	*26*	*4.3*	*21.3*	*29*	*4.8*	*23.8*	*32*	*5.3*	*26.2*	*37*	*6.1*	*30.3*	*37*	*6.1*	*30.3*
Balance	83	13.7	68.0	84	13.8	68.9	86	14.2	70.5	87	14.3	71.3	83	13.7	68.0	85	14.0	69.7

APPENDIX III.7

Number and Percent Distribution of 1970 Male Medical Graduates Accepting Medical School Faculty Appointments; Terminating Faculty Appointments; and Balance Remaining on Faculty by Year 1970-1980

	Prior to Year of M.D.			1970			1971			1972			1973			1974			1975			1976		
Years since Graduation				0			1			2			3			4			5			6		
	Number	Percent of Class	Percent of Total Appointments	Number	Percent of Class	Percent of Total Appointments	Number	Percent of Class	Percent of Total Appointments	Number	Percent of Class	Percent of Total Appointments	Number	Percent of Class	Percent of Total Appointments	Number	Percent of Class	Percent of Total Appointments	Number	Percent of Class	Percent of Total Appointments	Number	Percent of Class	Percent of Total Appointments
First Appointments	7	0.09	0.61	4	0.05	0.35	27	0.35	2.36	17	0.22	1.49	58	0.76	5.08	141	1.84	12.35	202	2.63	17.69	260	3.39	22.77
Cumulative Appointments	*7*	*0.09*	*0.61*	*11*	*0.14*	*0.96*	*38*	*0.50*	*3.30*	*55*	*0.72*	*4.82*	*113*	*1.47*	*9.89*	*254*	*3.31*	*22.24*	*456*	*5.95*	*39.93*	*716*	*9.34*	*62.70*
Final Deactivations	0			0			0			2	0.03	0.18	9	0.12	0.79	15	0.20	1.31	45	0.59	3.94	55	0.72	4.82
Cumulative Deactivations	*0*			*0*			*0*			*2*	*0.03*	*0.18*	*11*	*0.14*	*0.96*	*26*	*0.34*	*2.28*	*71*	*0.93*	*6.22*	*126*	*1.64*	*11.03*
Balance	7	0.09	0.61	11	0.14	0.96	38	0.50	3.30	53	0.69	4.64	102	1.33	8.93	228	2.97	19.96	385	5.02	33.71	590	7.70	51.66

	1977			1978			1979			1980			Year Unknown		
Years since Graduation	7			8			9			10					
	Number	Percent of Class	Percent of Total Appointments	Number	Percent of Class	Percent of Total Appointments	Number	Percent of Class	Percent of Total Appointments	Number	Percent of Class	Percent of Total Appointments	Number	Percent of Class	Percent of Total Appointments
First Appointments	229	2.99	20.05	114	1.49	9.98	54	0.70	4.73	19	0.25	1.66	10	0.13	0.88
Cumulative Appointments	*945*	*12.33*	*82.75*	*1059*	*13.81*	*92.73*	*1113*	*14.52*	*97.46*	*1132*	*14.76*	*99.12*	*1142*	*14.90*	*100.00*
Final Deactivations	80	1.04	7.01	60	0.78	5.25	66	0.86	5.78	33	0.43	2.89	0		
Cumulative Deactivations	*206*	*2.69*	*18.04*	*266*	*3.47*	*23.29*	*332*	*4.33*	*29.07*	*365*	*4.76*	*31.96*	*365*	*4.76*	*31.96*
Balance	739	9.64	64.71	793	10.34	69.44	781	10.19	68.39	767	10.00	67.16	777	10.13	68.04

APPENDIX III.8

Number and Percent Distribution of 1970 Female Medical Graduates Accepting Medical School Faculty Appointments; Terminating Faculty Appointments; and Balance Remaining on Faculty by Year 1970-1980

	Prior to Year of M.D.			1970			1971			1972			1973			1974			1975			1976		
Years since Graduation				0			1			2			3			4			5			6		
	Number	Percent of Class	Percent of Total Appointments	Number	Percent of Class	Percent of Total Appointments	Number	Percent of Class	Percent of Total Appointments	Number	Percent of Class	Percent of Total Appointments	Number	Percent of Class	Percent of Total Appointments	Number	Percent of Class	Percent of Total Appointments	Number	Percent of Class	Percent of Total Appointments	Number	Percent of Class	Percent of Total Appointments
First Appointments	0			1	0.1	0.6	4	0.6	2.5	1	0.1	0.6	12	1.7	7.6	48	6.9	30.4	47	6.7	29.7	23	3.3	14.6
Cumulative Appointments	*0*			*1*	*0.1*	*0.6*	*5*	*0.7*	*3.2*	*6*	*0.9*	*3.8*	*18*	*2.6*	*11.4*	*66*	*9.4*	*41.8*	*113*	*16.1*	*71.5*	*136*	*19.4*	*86.1*
Final Deactivations	0			0			0			0			1	0.1	0.6	1	0.1	0.6	9	1.3	5.7	16	2.3	10.1
Cumulative Deactivations	*0*			*0*			*0*			*0*			*1*	*0.1*	*0.6*	*2*	*0.3*	*1.3*	*11*	*1.6*	*7.0*	*27*	*3.9*	*17.1*
Balance	0			1	0.1	0.6	5	0.7	3.2	6	0.9	3.8	17	2.4	10.8	64	9.1	40.5	102	14.6	64.6	109	15.6	69.0

	1977			1978			1979			1980*			Year Unknown		
Years since Graduation	7			8			9			10					
	Number	Percent of Class	Percent of Total Appointments	Number	Percent of Class	Percent of Total Appointments	Number	Percent of Class	Percent of Total Appointments	Number	Percent of Class	Percent of Total Appointments	Number	Percent of Class	Percent of Total Appointments
First Appointments	11	1.6	7.0	3	0.4	1.9	5	0.7	3.2	2	0.3	1.3	1	0.1	0.6
Cumulative Appointments	*147*	*21.0*	*93.0*	*150*	*21.4*	*94.9*	*155*	*22.1*	*98.1*	*157*	*22.4*	*99.4*	*158*	*22.6*	*100.0*
Final Deactivations	12	1.7	7.6	6	0.9	3.8	9	1.3	5.7	3	0.4	1.9	0		
Cumulative Deactivations	*39*	*5.6*	*24.7*	*45*	*6.4*	*28.5*	*54*	*7.7*	*34.2*	*57*	*8.1*	*36.1*	*57*	*8.1*	*36.1*
Balance	108	15.4	68.4	105	15.0	66.5	101	14.4	63.9	100	14.3	63.3	101	14.43	63.92

APPENDIX III.9

Number and Percent Distribution of 1971 Male Medical Graduates Accepting Medical School Faculty Appointments; Terminating Faculty Appointments; and Balance Remaining on Faculty by Year 1971-1980

	Prior to Year of M.D.			1971			1972			1973			1974			1975			1976			1977		
Years since Graduation				0			1			2			3			4			5			6		
	Number	Percent of Class	Percent of Total Appointments	Number	Percent of Class	Percent of Total Appointments	Number	Percent of Class	Percent of Total Appointments	Number	Percent of Class	Percent of Total Appointments	Number	Percent of Class	Percent of Total Appointments	Number	Percent of Class	Percent of Total Appointments	Number	Percent of Class	Percent of Total Appointments	Number	Percent of Class	Percent of Total Appointments
First Appointments	7	0.09	0.61	33	0.41	2.88	22	0.27	1.92	30	0.37	2.62	82	1.01	7.17	169	2.07	14.77	253	3.11	22.12	223	2.74	19.49
Cumulative Appointments	*7*	*0.09*	*0.61*	*40*	*0.49*	*3.50*	*62*	*0.76*	*5.42*	*92*	*1.13*	*8.04*	*174*	*2.14*	*15.21*	*343*	*4.21*	*29.98*	*596*	*7.32*	*52.10*	*819*	*10.05*	*71.59*
Final Deactivations	0			1	0.01	0.09	0			14	0.17	1.22	16	0.20	1.4	26	0.32	2.27	60	0.74	5.24	56	0.69	4.90
Cumulative Deactivations	*0*			*1*	*0.01*	*0.09*	*1*	*0.01*	*0.09*	*15*	*0.18*	*1.31*	*31*	*0.38*	*2.71*	*57*	*0.70*	*4.98*	*117*	*1.44*	*10.23*	*173*	*2.12*	*15.12*
Balance	7	0.09	0.61	39	0.48	3.41	61	0.75	5.3	77	0.95	6.73	143	1.76	12.50	286	3.51	25.00	479	5.88	41.87	646	7.93	56.47

	1978			1979			1980*			Year Unknown		
Years since Graduation	7			8			9					
	Number	Percent of Class	Percent of Total Appointments	Number	Percent of Class	Percent of Total Appointments	Number	Percent of Class	Percent of Total Appointments	Number	Percent of Class	Percent of Total Appointments
First Appointments	181	2.22	15.82	95	1.17	8.3	40	0.49	3.50	9	0.11	0.79
Cumulative Appointments	*1000*	*12.27*	*87.41*	*1095*	*13.44*	*95.72*	*1135*	*13.93*	*99.21*	*1144*	*14.04*	*100.0*
Final Deactivations	78	0.96	6.82	61	0.75	5.33	39	0.48	3.41	0		
Cumulative Deactivations	*251*	*3.08*	*21.94*	*312*	*3.83*	*27.27*	*351*	*4.31*	*30.68*	*351*	*4.31*	*30.68*
Balance	749	9.19	65.47	783	9.61	68.44	784	9.62	68.53	793	9.73	69.32

APPENDIX III.10

Number and Percent Distribution of 1971 Female Medical Graduates Accepting Medical School Faculty Appointments; Terminating Faculty Appointments; and Balance Remaining on Faculty by Year 1971-1980

	Prior to Year of M.D.			1971			1972			1973			1974			1975			1976			1977		
Years since Graduation				0			1			2			3			4			5			6		
	Number	Percent of Class	Percent of Total Appointments	Number	Percent of Class	Percent of Total Appointments	Number	Percent of Class	Percent of Total Appointments	Number	Percent of Class	Percent of Total Appointments	Number	Percent of Class	Percent of Total Appointments	Number	Percent of Class	Percent of Total Appointments	Number	Percent of Class	Percent of Total Appointments	Number	Percent of Class	Percent of Total Appointments
First Appointments	2	0.2	1.1	4	0.5	2.1	0			2	0.2	1.1	20	2.4	10.5	59	7.1	31.1	49	5.9	25.8	29	3.5	15.3
Cumulative Appointments	*2*	*0.2*	*1.1*	*6*	*0.7*	*3.2*	*6*	*0.7*	*3.2*	*8*	*1.0*	*4.2*	*28*	*3.4*	*14.7*	*87*	*10.5*	*45.8*	*136*	*16.4*	*71.6*	*165*	*20.0*	*86.8*
Final Deactivations	0			0			1	0.1	0.5	2	0.2	1.1	0			0			13	1.6	6.8	11	1.3	5.8
Cumulative Deactivations	*0*			*0*			*1*	*0.1*	*0.5*	*3*	*0.4*	*1.6*	*3*	*0.4*	*1.6*	*3*	*0.4*	*1.6*	*16*	*1.9*	*8.4*	*27*	*3.3*	*14.2*
Balance	2	0.2	1.1	6	0.7	3.2	5	0.6	2.6	5	0.6	2.6	25	3.0	13.2	84	10.2	44.2	120	14.5	63.2	138	16.7	72.6

	1978			1979			1980*			Year Unknown		
Years since Graduation	7			8			9					
	Number	Percent of Class	Percent of Total Appointments	Number	Percent of Class	Percent of Total Appointments	Number	Percent of Class	Percent of Total Appointments	Number	Percent of Class	Percent of Total Appointments
First Appointments	11	1.3	5.8	9	1.1	4.7	4	0.5	2.1	1	0.1	0.5
Cumulative Appointments	*176*	*21.3*	*92.6*	*185*	*22.4*	*97.4*	*189*	*22.9*	*99.5*	*190*	*23.0*	*100.00*
Final Deactivations	11	1.3	5.8	12	1.5	6.3	7	0.8	3.7	0		
Cumulative Deactivations	*38*	*4.6*	*20.0*	*50*	*6.0*	*26.3*	*57*	*6.9*	*30.0*	*57*	*6.9*	*30.0*
Balance	138	16.7	72.6	135	16.3	71.1	132	16.0	69.5	133	16.1	70.0

APPENDIX III.11

Number and Percent Distribution of 1972 Male Medical Graduates Accepting Medical School Faculty Appointments; Terminating Faculty Appointments; and Balance Remaining on Faculty by Year 1972-1980

	Prior to Year of M.D.			1972			1973			1974			1975			1976			1977			1978		
Years since Graduation				0			1			2			3			4			5			6		
	Number	Percent of Class	Percent of Total Appointments	Number	Percent of Class	Percent of Total Appointments	Number	Percent of Class	Percent of Total Appointments	Number	Percent of Class	Percent of Total Appointments	Number	Percent of Class	Percent of Total Appointments	Number	Percent of Class	Percent of Total Appointments	Number	Percent of Class	Percent of Total Appointments	Number	Percent of Class	Percent of Total Appointments
First Appointments	8	0.09	0.67	30	0.35	2.51	11	0.13	0.92	28	0.32	2.35	155	1.78	12.98	246	2.83	20.60	322	3.70	26.97	184	2.12	15.41
Cumulative Appointments	*8*	*0.09*	*0.67*	*38*	*0.44*	*3.18*	*49*	*0.56*	*4.1*	*77*	*0.89*	*6.45*	*232*	*2.67*	*19.43*	*478*	*5.50*	*40.03*	*800*	*9.20*	*67.00*	*984*	*11.32*	*82.41*
Final Deactivations	0			0			0			4	0.05	0.34	12	0.14	1.01	36	0.41	3.02	75	0.86	6.28	78	0.90	6.53
Cumulative Deactivations	*0*			*0*			*0*			*4*	*0.05*	*0.34*	*16*	*0.18*	*1.34*	*52*	*0.60*	*4.36*	*127*	*1.46*	*10.64*	*205*	*2.36*	*17.17*
Balance	8	0.09	0.67	38	0.44	3.18	49	0.56	4.1	73	0.84	6.11	216	2.49	18.09	426	4.90	35.68	673	7.74	56.37	779	8.96	65.24

	1979			1980*			Year Unknown		
Years since Graduation	7			8					
	Number	Percent of Class	Percent of Total Appointments	Number	Percent of Class	Percent of Total Appointments	Number	Percent of Class	Percent of Total Appointments
First Appointments	126	1.45	10.55	68	0.78	5.70	16	0.18	1.34
Cumulative Appointments	*1110*	*12.77*	*92.96*	*1178*	*13.55*	*98.66*	*1194*	*13.74*	*100.00*
Final Deactivations	81	0.93	6.78	45	0.52	3.77	0		
Cumulative Deactivations	*286*	*3.29*	*23.95*	*331*	*3.81*	*27.72*	*331*	*3.81*	*27.72*
Balance	824	9.48	69.01	847	9.75	70.94	863	9.93	72.28

APPENDIX III.12

Number and Percent Distribution of 1972 Female Medical Graduates Accepting Medical School Faculty Appointments; Terminating Faculty Appointments; and Balance Remaining on Faculty by Year 1972-1980

	Prior to Year of M.D.			1972			1973			1974			1975			1976			1977			1978		
Years since Graduation				0			1			2			3			4			5			6		
	Number	Percent of Class	Percent of Total Appointments	Number	Percent of Class	Percent of Total Appointments	Number	Percent of Class	Percent of Total Appointments	Number	Percent of Class	Percent of Total Appointments	Number	Percent of Class	Percent of Total Appointments	Number	Percent of Class	Percent of Total Appointments	Number	Percent of Class	Percent of Total Appointments	Number	Percent of Class	Percent of Total Appointments
First Appointments	1	0.1	0.6	0			1	0.1	0.6	4	0.5	2.3	36	4.2	20.8	51	5.9	29.5	43	5.0	24.9	19	2.2	11.0
Cumulative Appointments	*1*	*0.1*	*0.6*	*1*	*0.1*	*0.6*	*2*	*0.2*	*1.2*	*6*	*0.7*	*3.5*	*42*	*4.9*	*24.3*	*93*	*10.8*	*53.8*	*136*	*15.8*	*78.6*	*155*	*18.0*	*89.6*
Final Deactivations	0			0			0			1	0.1	0.6	1	0.1	0.6	8	0.9	4.6	10	1.2	5.8	10	1.2	5.8
Cumulative Deactivations	*0*			*0*			*0*			*1*	*0.1*	*0.6*	*2*	*0.2*	*1.2*	*10*	*1.2*	*5.8*	*20*	*2.3*	*11.6*	*30*	*3.5*	*17.3*
Balance	1	0.1	0.6	1	0.1	0.6	2	0.2	1.2	5	0.6	2.9	40	4.7	23.1	83	9.7	48.0	116	13.5	67.1	125	14.5	72.3

	1979			1980*			Year Unknown		
Years since Graduation	7			8					
	Number	Percent of Class	Percent of Total Appointments	Number	Percent of Class	Percent of Total Appointments	Number	Percent of Class	Percent of Total Appointments
First Appointments	13	1.5	7.5	4	0.5	2.3	1	0.1	0.6
Cumulative Appointments	*168*	*19.5*	*97.1*	*172*	*20.0*	*99.4*	*173*	*20.1*	*100.0*
Final Deactivations	10	1.2	5.8	6	0.7	3.5	0		
Cumulative Deactivations	*40*	*4.7*	*23.1*	*46*	*5.3*	*26.6*	*46*	*5.3*	*26.6*
Balance	128	14.9	74.0	126	14.7	72.8	127	14.8	73.4

APPENDIX III.13

Number and Percent Distribution of 1973 Male Medical Graduates Accepting Medical School Faculty Appointments; Terminating Faculty Appointments; and Balance Remaining on Faculty by Year 1973-1980

	Prior to Year of M.D.			1973			1974			1975			1976			1977			1978			1979		
Years since Graduation				0			1			2			3			4			5			6		
	Number	Percent of Class	Percent of Total Appointments	Number	Percent of Class	Percent of Total Appointments	Number	Percent of Class	Percent of Total Appointments	Number	Percent of Class	Percent of Total Appointments	Number	Percent of Class	Percent of Total Appointments	Number	Percent of Class	Percent of Total Appointments	Number	Percent of Class	Percent of Total Appointments	Number	Percent of Class	Percent of Total Appointments
First Appointments	13	0.14	1.17	22	0.23	1.97	15	0.16	1.35	32	0.34	2.87	160	1.69	14.36	274	2.89	24.60	284	3.00	25.49	206	2.18	18.49
Cumulative Appointments	*13*	*0.14*	*1.17*	*35*	*0.37*	*3.14*	*50*	*0.53*	*4.99*	*82*	*0.87*	*7.36*	*242*	*2.56*	*21.72*	*516*	*5.45*	*46.32*	*800*	*8.45*	*71.81*	*1006*	*10.63*	*90.31*
Final Deactivations	0			1	0.01	0.09	7	0.07	0.63	4	0.04	0.36	15	0.16	1.35	46	0.49	4.13	84	0.89	7.54	81	0.86	7.27
Cumulative Deactivations	*0*			*1*	*0.01*	*0.09*	*8*	*0.08*	*0.72*	*12*	*0.13*	*1.08*	*27*	*0.29*	*2.42*	*73*	*0.77*	*6.55*	*157*	*1.66*	*14.09*	*238*	*2.51*	*21.36*
Balance	13	0.14	1.17	34	0.36	3.05	42	0.44	3.77	70	0.74	6.28	215	2.27	19.30	443	4.68	39.77	643	6.79	57.72	768	8.11	68.94

	1980*			Year Unknown		
Years since Graduation	7					
	Number	Percent of Class	Percent of Total Appointments	Number	Percent of Class	Percent of Total Appointments
First Appointments	97	1.02	8.71	11	0.12	0.99
Cumulative Appointments	*1103*	*11.65*	*99.01*	*1114*	*11.77*	*100.0*
Final Deactivations	45	0.48	4.04	0		
Cumulative Deactivations	*283*	*2.99*	*25.40*	*283*	*2.99*	*25.40*
Balance	820	8.66	73.61	831	8.78	74.6

Number and Percent Distribution of 1973 Female Medical Graduates Accepting Medical School Faculty Appointments; Terminating Faculty Appointments; and Balance Remaining on Faculty by Year 1973-1980

	Prior to Year of M.D.			1973			1974			1975			1976			1977			1978			1979		
Years since Graduation				0			1			2			3			4			5			6		
	Number	Percent of Class	Percent of Total Appointments	Number	Percent of Class	Percent of Total Appointments	Number	Percent of Class	Percent of Total Appointments	Number	Percent of Class	Percent of Total Appointments	Number	Percent of Class	Percent of Total Appointments	Number	Percent of Class	Percent of Total Appointments	Number	Percent of Class	Percent of Total Appointments	Number	Percent of Class	Percent of Total Appointments
First Appointments	1	0.1	0.7	2	0.2	1.4	3	0.3	2.2	2	0.2	1.4	26	2.8	18.7	38	4.1	27.3	36	3.9	25.9	23	2.5	16.5
Cumulative Appointments	*1*	*0.1*	*0.7*	*3*	*0.3*	*2.2*	*6*		*4.3*	*8*	*0.9*	*5.8*	*34*	*3.7*	*24.5*	*72*	*7.8*	*51.8*	*108*	*11.7*	*77.7*	*131*	*14.2*	*94.2*
Final Deactivations	0			0			0			0			0			4	0.4	2.9	7	0.8	5.0	8	0.9	5.8
Cumulative Deactivations	*0*			*0*			*0*			*0*			*0*			*4*	*0.4*	*2.9*	*11*	*1.2*	*7.9*	*19*	*2.1*	*13.7*
Balance	1	0.1	0.7	3	0.3	2.2	6	0.6	4.3	8	0.9	5.8	34	3.7	24.5	68	7.4	48.9	97	10.5	69.8	112	12.1	80.6

	1980*			Year Unknown		
Years since Graduation	7					
	Number	Percent of Class	Percent of Total Appointments	Number	Percent of Class	Percent of Total Appointments
First Appointments	7	0.8	5.0	1	0.1	0.7
Cumulative Appointments	*138*	*14.9*	*99.3*	*139*	*15.0*	*100.0*
Final Deactivations	11	1.2	7.9	0		
Cumulative Deactivations	*30*	*3.2*	*21.6*	*30*	*3.2*	*21.6*
Balance	108	11.7	77.7	109	11.8	78.4

APPENDIX III.15

Number and Percent Distribution of 1974 Male Medical Graduates Accepting Medical School Faculty Appointments; Terminating Faculty Appointments; and Balance Remaining on Faculty by Year 1974-1980

	Prior to Year of M.D.			1974			1975			1976			1977			1978			1979			1980*		
Years since Graduation				0			1			2			3			4			5			6		
	Number	Percent of Class	Percent of Total Appointments	Number	Percent of Class	Percent of Total Appointments	Number	Percent of Class	Percent of Total Appointments	Number	Percent of Class	Percent of Total Appointments	Number	Percent of Class	Percent of Total Appointments	Number	Percent of Class	Percent of Total Appointments	Number	Percent of Class	Percent of Total Appointments	Number	Percent of Class	Percent of Total Appointments
First Appointments	13	0.13	1.48	10	0.10	1.14	10	0.10	1.14	22	0.21	2.51	157	1.52	17.88	215	2.08	24.49	278	2.69	31.66	158	1.53	18.00
Cumulative Appointments	*13*	*0.13*	*1.48*	*23*	*0.22*	*2.62*	*33*	*0.32*	*3.76*	*55*	*0.53*	*6.26*	*212*	*2.05*	*24.15*	*427*	*4.13*	*48.63*	*705*	*6.81*	*80.30*	*863*	*8.34*	*98.29*
Final Deactivations	0			1	0.01	0.11	0			4	0.04	0.46	11	0.11	1.25	28	0.27	3.19	69	0.67	7.86	52	0.50	5.92
Cumulative Deactivations	*0*			*1*	*0.01*	*0.11*	*1*	*0.01*	*0.11*	*5*	*0.05*	*0.57*	*16*	*0.15*	*1.82*	*44*	*0.43*	*5.01*	*113*	*1.09*	*12.87*	*165*	*1.58*	*18.79*
Balance	13	0.13	1.48	22	0.21	2.51	32	0.31	3.64	50	0.48	5.69	196	1.89	22.32	383	3.70	43.62	592	5.72	67.43	698	6.74	79.50

	Year Unknown		
Years since Graduation			
	Number	Percent of Class	Percent of Total Appointments
First Appointments	15	0.14	1.71
Cumulative Appointments	*878*	*8.48*	*100.00*
Final Deactivations	0		
Cumulative Deactivations	*165*	*1.59*	*18.79*
Balance	713	6.89	81.21

APPENDIX III.16

Number and Percent Distribution of 1974 Female Medical Graduates Accepting Medical School Faculty Appointments; Terminating Faculty Appointments; and Balance Remaining on Faculty by Year 1974-1980

	Prior to Year of M.D.			1974			1975			1976			1977			1978			1979			1980*		
Years since Graduation				0			1			2			3			4			5			6		
	Number	Percent of Class	Percent of Total Appointments	Number	Percent of Class	Percent of Total Appointments	Number	Percent of Class	Percent of Total Appointments	Number	Percent of Class	Percent of Total Appointments	Number	Percent of Class	Percent of Total Appointments	Number	Percent of Class	Percent of Total Appointments	Number	Percent of Class	Percent of Total Appointments	Number	Percent of Class	Percent of Total Appointments
First Appointments	4	0.3	2.7	1	0.1	0.7	5	0.4	3.4	3	0.2	2.0	29	2.3	19.6	50	4.0	33.8	37	3.0	25.0	17	1.4	11.5
Cumulative Appointments	*4*	*0.3*	*2.7*	*5*	*0.4*	*3.4*	*10*	*0.8*	*6.8*	*13*	*1.0*	*8.8*	*42*	*3.4*	*28.4*	*92*	*7.4*	*62.2*	*129*	*10.4*	*87.2*	*146*	*11.7*	*98.6*
Final Deactivations	0			0			0			1	0.1	0.7	3	0.2	2.0	8	0.6	5.4	12	1.0	8.1	9	0.7	6.1
Cumulative Deactivations	*0*			*0*			*0*			*1*	*0.1*	*0.7*	*4*	*0.3*	*2.7*	*12*	*1.0*	*8.1*	*24*	*1.9*	*16.2*	*33*	*2.6*	*22.3*
Balance	4	0.3	2.7	5	0.4	3.4	10	0.8	6.8	12	1.0	8.1	38	3.0	25.7	80	6.4	54.1	105	8.4	70.9	113	9.1	76.4

	Year Unknown		
Years since Graduation			
	Number	Percent of Class	Percent of Total Appointments
First Appointments	2	0.2	1.4
Cumulative Appointments	*148*	*11.9*	*100.0*
Final Deactivations	0		
Cumulative Deactivations	*33*	*2.6*	*22.3*
Balance	115	9.2	77.7

APPENDIX III.17

Number and Percent Distribution of 1971 Black Medical Graduates Accepting Medical School Faculty Appointments; Terminating Faculty Appointments; and Balance Remaining on Faculty by Year 1971-1980

	Prior to Year of M.D.			1971			1972			1973			1974			1975			1976			1977		
Years since Graduation				0			1			2			3			4			5			6		
	Number	Percent of Class	Percent of Total Appointments	Number	Percent of Class	Percent of Total Appointments	Number	Percent of Class	Percent of Total Appointments	Number	Percent of Class	Percent of Total Appointments	Number	Percent of Class	Percent of Total Appointments	Number	Percent of Class	Percent of Total Appointments	Number	Percent of Class	Percent of Total Appointments	Number	Percent of Class	Percent of Total Appointments
First Appointments	0			0			1	0.6	5.3	0			1	0.6	5.3	5	2.8	26.3	3	1.7	15.8	4	2.2	21.0
Cumulative Appointments	*0*			*0*			*1*	*0.6*	*5.3*	*1*	*0.6*	*5.3*	*2*	*1.1*	*10.5*	*7*	*3.9*	*36.8*	*10*	*5.6*	*52.6*	*14*	*7.8*	*73.7*
Final Deactivations	0			0			0			0			0			0			3	1.7	15.8	1	0.6	5.3
Cumulative Deactivations	*0*			*0*			*0*			*0*			*0*			*0*			*3*	*1.7*	*15.8*	*4*	*2.2*	*21.1*
Balance	0			0			1	0.6	5.3	1	0.6	5.3	2	1.1	10.5	7	3.9	36.8	7	3.9	36.8	10	5.5	52.6

	1978			1979			1980*			Year Unknown		
Years since Graduation	7			8			9					
	Number	Percent of Class	Percent of Total Appointments	Number	Percent of Class	Percent of Total Appointments	Number	Percent of Class	Percent of Total Appointments	Number	Percent of Class	Percent of Total Appointments
First Appointments	4	2.2	21.0	1	0.6	5.3	0			0		
Cumulative Appointments	*18*	*10.0*	*94.7*	*19*	*10.6*	*100.0*	*19*	*10.6*	*100.0*	*19*	*10.6*	*100.0*
Final Deactivations	1	0.6	5.3	1	0.6	5.3	1	0.6	5.3	0		
Cumulative Deactivations	*5*	*2.8*	*26.3*	*6*	*3.3*	*31.6*	*7*	*3.9*	*36.8*	*7*	*3.9*	*36.8*
Balance	13	7.2	68.4	13	7.2	68.4	12	6.7	63.2	12	6.7	63.2

APPENDIX III.18

Number and Percent Distribution of 1971 Asian Medical Graduates Accepting Medical School Faculty Appointments; Terminating Faculty Appointments; and Balance Remaining on Faculty by Year 1971-1980

	Prior to Year of M.D.			1971			1972			1973			1974			1975			1976			1977		
Years since Graduation	-			0			1			2			3			4			5			6		
	Number	Percent of Class	Percent of Total Appointments	Number	Percent of Class	Percent of Total Appointments	Number	Percent of Class	Percent of Total Appointments	Number	Percent of Class	Percent of Total Appointments	Number	Percent of Class	Percent of Total Appointments	Number	Percent of Class	Percent of Total Appointments	Number	Percent of Class	Percent of Total Appointments	Number	Percent of Class	Percent of Total Appointments
First Appointments	0			0			1	0.8	4.2	1	0.8	4.2	4	3.2	16.7	6	4.8	25.0	7	5.6	29.2	3	2.4	12.5
Cumulative Appointments	*0*			*0*			*1*	*0.8*	*4.2*	*2*	*1.6*	*8.3*	*6*	*4.8*	*25.0*	*12*	*9.7*	*50.0*	*19*	*15.3*	*79.2*	*22*	*17.7*	*91.7*
Final Deactivations	0			0			0			0			0			1	0.8	4.2	1	0.8	4.2	2	1.6	8.3
Cumulative Deactivations	*0*			*0*			*0*			*0*			*0*			*1*	*0.8*	*4.2*	*2*	*1.6*	*8.3*	*4*	*3.2*	*16.7*
Balance	0			0			1	0.8	4.2	2	1.6	8.3	6	4.8	25.0	11	8.9	50.5	17	13.7	70.8	18	14.5	75.0

	1978			1979			1980*			Year Unknown		
Years since Graduation	7			8			9					
	Number	Percent of Class	Percent of Total Appointments	Number	Percent of Class	Percent of Total Appointments	Number	Percent of Class	Percent of Total Appointments	Number	Percent of Class	Percent of Total Appointments
First Appointments	1	0.8	4.2	0			0			1	0.8	4.2
Cumulative Appointments	*23*	*18.5*	*95.8*	*23*	*18.5*	*95.8*	*23*	*18.5*	*95.8*	*24*	*19.4*	*100.0*
Final Deactivations	3	2.4	12.5	0			1	0.8	4.2	0		
Cumulative Deactivations	*7*	*5.6*	*29.2*	*7*	*5.6*	*29.2*	*8*	*6.5*	*33.3*	*8*	*6.5*	*33.3*
Balance	16	12.9	66.7	16	12.9	66.7	15	12,1	62.5	16	12.9	66.7

APPENDIX III.19

Number and Percent Distribution of 1971 Caucasian Medical Graduates Accepting Medical School Faculty Appointments; Terminating Faculty Appointments; and Balance Remaining on Faculty by Year 1971-1980

	Prior to Year of M.D.			1971			1972			1973			1974			1975			1976			1977		
Years since Graduation				0			1			2			3			4			5			6		
	Number	Percent of Class	Percent of Total Appointments	Number	Percent of Class	Percent of Total Appointments	Number	Percent of Class	Percent of Total Appointments	Number	Percent of Class	Percent of Total Appointments	Number	Percent of Class	Percent of Total Appointments	Number	Percent of Class	Percent of Total Appointments	Number	Percent of Class	Percent of Total Appointments	Number	Percent of Class	Percent of Total Appointments
First Appointments	8	0.10	0.71	36	0.43	3.18	17	0.20	1.50	25	0.30	2.21	83	0.99	7.33	196	2.34	17.31	262	3.13	23.14	218	2.61	19.26
Cumulative Appointments	*8*	*0.10*	*0.71*	*44*	*0.53*	*3.89*	*61*	*0.73*	*5.39*	*86*	*1.03*	*7.60*	*169*	*2.02*	*14.93*	*365*	*4.36*	*32.24*	*627*	*7.49*	*55.39*	*845*	*10.10*	*74.65*
Final Deactivations	0			1	0.01	0.09	1	0.01	0.09	16	0.19	1.41	15	0.18	1.33	21	0.25	1.86	58	0.69	5.12	60	0.72	5.30
Cumulative Deactivations	*0*			*1*	*0.01*	*0.09*	*2*	*0.02*	*0.18*	*18*	*0.22*	*1.59*	*33*	*0.39*	*2.92*	*54*	*0.65*	*4.77*	*112*	*1.34*	*9.89*	*172*	*2.06*	*15.19*
Balance	8	0.10	0.71	43	0.51	3.80	59	0.71	5.21	68	0.81	6.01	136	1.63	12.01	311	3.72	27.47	515	6.15	45.49	673	8.04	59.45

	1978			1979			1980*			Year Unknown		
Years since Graduation	7			8			9					
	Number	Percent of Class	Percent of Total Appointments	Number	Percent of Class	Percent of Total Appointments	Number	Percent of Class	Percent of Total Appointments	Number	Percent of Class	Percent of Total Appointments
First Appointments	159	1.90	14.05	88	1.05	7.77	32	0.38	2.83	8	0.10	0.71
Cumulative Appointments	*1004*	*12.00*	*88.69*	*1092*	*13.05*	*96.47*	*1124*	*13.43*	*99.29*	*1132*	*13.53*	*100.0*
Final Deactivations	76	0.91	6.71	60	0.72	5.30	41	0.49	3.62	0		
Cumulative Deactivations	*248*	*2.96*	*21.91*	*308*	*3.68*	*27.21*	*349*	*4.17*	*30.83*	*349*	*4.17*	*30.83*
Balance	756	9.03	66.78	784	9.37	69.26	775	9.26	68.46	783	9.36	69.17

APPENDIX III.20

Number and Percent Distribution of 1972 Black Medical Graduates Accepting Medical School Faculty Appointments; Terminating Faculty Appointments; and Balance Remaining on Faculty by Year 1972-1980

	Prior to Year of M.D.			1972			1973			1974			1975			1976			1977			1978		
Years since Graduation				0			1			2			3			4			5			6		
	Number	Percent of Class	Percent of Total Appointments	Number	Percent of Class	Percent of Total Appointments	Number	Percent of Class	Percent of Total Appointments	Number	Percent of Class	Percent of Total Appointments	Number	Percent of Class	Percent of Total Appointments	Number	Percent of Class	Percent of Total Appointments	Number	Percent of Class	Percent of Total Appointments	Number	Percent of Class	Percent of Total Appointments
First Appointments	0			0			0			0			3	1.3	20.0	5	2.2	33.3	5	2.2	33.3	1	0.4	6.7
Cumulative Appointments	*0*			*0*			*0*			*0*			*3*	*1.3*	*20.0*	*8*	*3.5*	*53.3*	*13*	*5.7*	*86.7*	*14*	*6.1*	*93.3*
Final Deactivations	0			0			0			0			0			0			0			3	1.3	20.0
Cumulative Deactivations	*0*			*0*			*0*			*0*			*0*			*0*			*0*			*3*	*1.3*	*20.0*
Balance	0			0			0			0			3	1.3	20.0	8	3.5	53.3	13	5.7	86.7	11	4.8	73.3

	1979			1980*			Year Unknown		
Years since Graduation	7			8					
	Number	Percent of Class	Percent of Total Appointments	Number	Percent of Class	Percent of Total Appointments	Number	Percent of Class	Percent of Total Appointments
First Appointments	0			1	0.4	6.7	0		
Cumulative Appointments	*14*	*6.1*	*93.3*	*15*	*6.6*	*100.0*	*15*	*6.6*	*100.0*
Final Deactivations	0			0			0		
Cumulative Deactivations	*3*	*1.3*	*20.0*	*3*	*1.3*	*20.0*	*3*	*1.3*	*20.0*
Balance	11	4.8	73.3	12	5.2	80.0	12	5.2	80.0

APPENDIX III.21

Number and Percent Distribution of 1972 Asian Medical Graduates Accepting Medical School Faculty Appointments; Terminating Faculty Appointments; and Balance Remaining on Faculty by Year 1972-1980

	Prior to Year of M.D.			1972			1973			1974			1975			1976			1977			1978		
Years since Graduation				0			1			2			3			4			5			6		
	Number	Percent of Class	Percent of Total Appointments	Number	Percent of Class	Percent of Total Appointments	Number	Percent of Class	Percent of Total Appointments	Number	Percent of Class	Percent of Total Appointments	Number	Percent of Class	Percent of Total Appointments	Number	Percent of Class	Percent of Total Appointments	Number	Percent of Class	Percent of Total Appointments	Number	Percent of Class	Percent of Total Appointments
First Appointments	1	0.8	7.1	0			0			0			3	2.4	21.4	4	3.2	28.6	4	3.2	28.6	0		
Cumulative Appointments	*1*	*0.8*	*7.1*	*1*	*0.8*	*7.1*	*1*	*0.8*	*7.1*	*1*	*0.8*	*7.1*	*4*	*3.2*	*28.6*	*8*	*6.4*	*57.1*	*12*	*9.6*	*85.7*	*12*	*9.6*	*85.7*
Final Deactivations	0			0			0			0			0			0			2	1.6	14.3	1	0.8	7.1
Cumulative Deactivations	*0*			*0*			*0*			*0*			*0*			*0*			*2*	*1.6*	*14.3*	*3*	*2.4*	*21.4*
Balance	1	0.8	7.1	1	0.8	7.1	1	0.8	7.1	1	0.8	7.1	4	3.2	28.6	8	6.4	57.1	10	8.0	71.4	9	7.2	64.3

	1979			1980*			Year Unknown		
Years since Graduation	7			8					
	Number	Percent of Class	Percent of Total Appointments	Number	Percent of Class	Percent of Total Appointments	Number	Percent of Class	Percent of Total Appointments
First Appointments	2	1.6	14.3	0			0		
Cumulative Appointments	*14*	*11.2*	*100.0*	*14*	*11.2*	*100.0*	*14*	*11.2*	*100.0*
Final Deactivations	2	1.6	14.3	0			0		
Cumulative Deactivations	*5*	*4.0*	*35.7*	*5*	*4.0*	*35.7*	*5*	*4.0*	*35.7*
Balance	9	7.2	64.3	9	7.2	64.3	9	7.2	64.3

APPENDIX III.22

Number and Percent Distribution of 1972 Caucasian Medical Graduates Accepting Medical School Faculty Appointments; Terminating Faculty Appointments; and Balance Remaining on Faculty by Year 1972-1980

	Prior to Year of M.D.			1972			1973			1974			1975			1976			1977			1978		
Years since Graduation				0			1			2			3			4			5			6		
	Number	Percent of Class	Percent of Total Appointments	Number	Percent of Class	Percent of Total Appointments	Number	Percent of Class	Percent of Total Appointments	Number	Percent of Class	Percent of Total Appointments	Number	Percent of Class	Percent of Total Appointments	Number	Percent of Class	Percent of Total Appointments	Number	Percent of Class	Percent of Total Appointments	Number	Percent of Class	Percent of Total Appointments
First Appointments	7	0.08	0.59	24	0.27	2.03	7	0.08	0.59	25	0.28	2.11	172	1.91	14.54	251	2.78	21.22	325	3.60	27.47	181	2.01	15.30
Cumulative Appointments	*7*	*0.08*	*0.59*	*31*	*0.34*	*2.62*	*38*	*0.42*	*3.21*	*63*	*0.70*	*5.33*	*235*	*2.60*	*19.86*	*486*	*5.39*	*41.08*	*811*	*8.99*	*68.55*	*992*	*11.00*	*83.85*
Final Deactivations	0			0			0			5	0.06	0.42	10	0.11	0.85	40	0.44	3.38	77	0.85	6.51	69	0.76	5.83
Cumulative Deactivations	*0*			*0*			*0*			*5*	*0.06*	*0.42*	*15*	*0.17*	*1.27*	*55*	*0.61*	*4.65*	*132*	*1.46*	*11.16*	*201*	*2.23*	*16.99*
Balance	7	0.08	0.54	31	0.34	2.62	38	0.42	3.21	58	0.64	4.90	220	2.44	18.60	431	4.78	36.43	679	7.53	57.40	791	8.77	66.86

	1979			1980*			Year Unknown		
Years since Graduation	7			8					
	Number	Percent of Class	Percent of Total Appointments	Number	Percent of Class	Percent of Total Appointments	Number	Percent of Class	Percent of Total Appointments
First Appointments	118	1.31	9.97	56	0.62	4.73	17	0.19	1.44
Cumulative Appointments	*1110*	*12.30*	*93.83*	*1166*	*12.92*	*98.56*	*1183*	*13.11*	*100.0*
Final Deactivations	75	0.83	6.34	50	0.55	4.23	0		
Cumulative Deactivations	*276*	*3.06*	*23.33*	*326*	*3.61*	*27.56*	*326*	*3.61*	*27.56*
Balance	834	9.24	70.50	840	9.31	71.01	857	9.50	72.44

APPENDIX III.23

Number and Percent Distribution of 1973 Black Medical Graduates Accepting Medical School Faculty Appointments; Terminating Faculty Appointments; and Balance Remaining on Faculty by Year 1973-1980

	Prior to Year of M.D.			1973			1974			1975			1976			1977			1978			1979		
Years since Graduation				0			1			2			3			4			5			6		
	Number	Percent of Class	Percent of Total Appointments	Number	Percent of Class	Percent of Total Appointments	Number	Percent of Class	Percent of Total Appointments	Number	Percent of Class	Percent of Total Appointments	Number	Percent of Class	Percent of Total Appointments	Number	Percent of Class	Percent of Total Appointments	Number	Percent of Class	Percent of Total Appointments	Number	Percent of Class	Percent of Total Appointments
First Appointments	1	0.3	3.7	1	0.3	3.7	0			2	0.6	7.4	5	1.5	18.5	4	1.2	14.8	10	2.9	37.0	2	0.6	7.4
Cumulative Appointments	*1*	*0.3*	*3.7*	*2*	*0.6*	*7.4*	*2*	*0.6*	*7.4*	*4*	*1.2*	*14.8*	*9*	*2.6*	*33.3*	*13*	*3.8*	*48.1*	*23*	*6.8*	*85.2*	*25*	*7.4*	*92.6*
Final Deactivations	0			0			1	0.3	3.7	0			0			0			2	0.5	7.4	3	0.9	11.1
Cumulative Deactivations	*0*			*0*			*1*	*0.3*	*3.7*	*1*	*0.3*	*3.7*	*1*	*0.3*	*3.7*	*1*	*0.3*	*3.7*	*3*	*0.9*	*11.1*	*6*	*1.8*	*22.2*
Balance	1	0.3	3.7	2	0.6	7.4	1	0.3	3.7	3	0.9	11.1	8	2.4	29.6	12	3.5	44.4	20	5.9	74.1	19	5.6	70.4

	1980*			Year Unknown		
Years since Graduation	7					
	Number	Percent of Class	Percent of Total Appointments	Number	Percent of Class	Percent of Total Appointments
First Appointments	2	0.6	7.4	0		
Cumulative Appointments	*27*	*7.9*	*100.0*	*27*	*7.9*	*100.0*
Final Deactivations	2	0.6	7.4	0		
Cumulative Deactivations	*8*	*2.4*	*29.6*	*8*	*2.4*	*29.6*
Balance	19	5.6	70.4	19	5.6	70.4

APPENDIX III.24

Number and Percent Distribution of 1973 Asian Medical Graduates Accepting Medical School Faculty Appointments; Terminating Faculty Appointments; and Balance Remaining on Faculty by Year 1973-1980

	Prior to Year of M.D.			1973			1974			1975			1976			1977			1978			1979		
Years since Graduation				0			1			2			3			4			5			6		
	Number	Percent of Class	Percent of Total Appointments	Number	Percent of Class	Percent of Total Appointments	Number	Percent of Class	Percent of Total Appointments	Number	Percent of Class	Percent of Total Appointments	Number	Percent of Class	Percent of Total Appointments	Number	Percent of Class	Percent of Total Appointments	Number	Percent of Class	Percent of Total Appointments	Number	Percent of Class	Percent of Total Appointments
First Appointments	0			0			1	0.8	8.3	1	0.8	8.3	1	0.8	8.3	3	2.4	25.0	2	1.6	16.7	2	1.6	16.7
Cumulative Appointments	*0*			*0*			*1*	*0.8*	*8.3*	*2*	*1.6*	*16.7*	*3*	*2.4*	*25.0*	*6*	*4.8*	*50.0*	*8*	*6.5*	*83.3*	*10*	*8.1*	*83.3*
Final Deactivations	0			0			0			0			0			1	0.8	8.3	1	0.8	8.3	1	0.8	8.3
Cumulative Deactivations	*0*			*0*			*0*			*0*			*0*			*1*	*0.8*	*8.3*	*2*	*1.6*	*16.7*	*3*	*2.4*	*25.0*
Balance	0			0			1	0.8	8.3	2	1.6	16.7	3	2.4	25.0	5	4.0	41.7	6	4.8	50.0	7	5.6	58.3

	1980*			Year Unknown		
Years since Graduation	7					
	Number	Percent of Class	Percent of Total Appointments	Number	Percent of Class	Percent of Total Appointments
First Appointments	1	0.8	8.3	1	0.8	8.3
Cumulative Appointments	*11*	*8.9*	*91.7*	*12*	*9.7*	*100.0*
Final Oeactivations	1	0.8	8.3	0		
Cumulative Deactivations	*4*	*3.2*	*33.3*	*4*	*3.2*	*33.3*
Balance	7	5.6	58.3	8	6.5	66.7

APPENDIX III.25

Number and Percent Distribution of 1973 Caucasian Medical Graduates Accepting Medical School Faculty Appointments; Terminating Faculty Appointments; and Balance Remaining on Faculty by Year 1973-1980

	Prior to Year of M.D.			1973			1974			1975			1976			1977			1978			1979		
Years since Graduation				0			1			2			3			4			5			6		
	Number	Percent of Class	Percent of Total Appointments	Number	Percent of Class	Percent of Total Appointments	Number	Percent of Class	Percent of Total Appointments	Number	Percent of Class	Percent of Total Appointments	Number	Percent of Class	Percent of Total Appointments	Number	Percent of Class	Percent of Total Appointments	Number	Percent of Class	Percent of Total Appointments	Number	Percent of Class	Percent of Total Appointments
First Appointments	10	0.10	0.95	21	0.22	2.00	15	0.15	1.43	30	0.31	2.85	155	1.60	14.75	277	2.86	26.36	265	2.74	25.21	187	1.93	17.79
Cumulative Appointments	*10*	*0.10*	*0.95*	*31*	*0.32*	*2.95*	*46*	*0.47*	*4.38*	*76*	*0.78*	*7.23*	*231*	*2.38*	*21.98*	*508*	*5.24*	*48.33*	*773*	*7.98*	*73.55*	*960*	*9.91*	*91.34*
Final Deactivations	0			1			6	0.06	0,57	4	0.04	0.38	15	0.15	1.43	42	0.43	4.00	81	0.84	7.71	69	0.71	6.57
Cumulative Deactivations	*0*			*1*			*7*	*0.07*	*0.67*	*11*	*0.11*	*1.05*	*26*	*0.27*	*2.47*	*68*	*0.70*	*6.47*	*149*	*1.54*	*14.18*	*218*	*2.25*	*20.74*
Balance	10	0.1	0.95	30	0.31	2.85	39	0.40	3.71	65	0.67	6.18	205	2.12	19.51	440	4.54	41.86	624	6.44	59.37	742	7.66	70.60

	1980*			Year Unknown		
Years since Graduation	7					
	Number	Percent of Class	Percent of Total Appointments	Number	Percent of Class	Percent of Total Appointments
First Appointments	82	0.85	7.80	9	0.09	0.86
Cumulative Appointments	*1042*	*10.76*	*99.14*	*1051*	*10.86*	*100.0*
Final Deactivations	48	0.50	4.57	0		
Cumulative Deactivations	*266*	*2.75*	*25.31*	*266*	*2.75*	*25.31*
Balance	776	8.01	73.83	785	8.10	74.69

APPENDIX III.26

Number and Percent Distribution of 1974 Black Medical Graduates Accepting Medical School Faculty Appointments; Terminating Faculty Appointments; and Balance Remaining on Faculty by Year 1974-1980

	Prior to Year of M.D.			1974			1975			1976			1977			1978			1979			1980		
Years since Graduation				0			1			2			3			4			5			6		
	Number	Percent of Class	Percent of Total Appointments	Number	Percent of Class	Percent of Total Appointments	Number	Percent of Class	Percent of Total Appointments	Number	Percent of Class	Percent of Total Appointments	Number	Percent of Class	Percent of Total Appointments	Number	Percent of Class	Percent of Total Appointments	Number	Percent of Class	Percent of Total Appointments	Number	Percent of Class	Percent of Total Appointments
First Appointments	2	0.4	8.3	0			1	0.2	4.2	0			6	1.2	25.0	9	1.8	37.5	4	0.8	16.7	2	0.4	8.3
Cumulative Appointments	*2*	*0.4*	*8.3*	*2*	*0.4*	*8.3*	*3*	*0.6*	*12.5*	*3*	*0.6*	*12.5*	*9*	*1.8*	*37.5*	*18*	*3.5*	*75.0*	*22*	*4.3*	*91.7*	*24*	*4.5*	*100.0*
Final Deactivations	0			0			0			1	0.2	4.2	0			0			2	0.4	8.3	2	0.4	8.3
Cumulative Deactivations	*0*			*0*			*0*			*1*	*0.2*	*4.2*	*1*	*0.2*	*4.2*	*1*	*0.2*	*4.2*	*3*	*0.6*	*12.5*	*5*	*1.0*	*20.8*
Balance	2	0.4	8.3	2	0.4	8.3	3	0.6	12.5	2	0.4	8.3	8	1.6	33.3	17	3.3	70.8	19	3.7	79.2	19	3.7	79.2

	Year Unknown		
Years since Graduation			
	Number	Percent of Class	Percent of Total Appointments
First Appointments	0		
Cumulative Appointments	*24*	*4.7*	*100.0*
Final Deactivations	0		
Cumulative Deactivations	*5*	*1.0*	*20.8*
Balance	19	3.7	79.2

APPENDIX III.27

Number and Percent Distribution of 1974 Asian Medical Graduates Accepting Medical School Faculty Appointments; Terminating Faculty Appointments; and Balance Remaining on Faculty by Year 1974-1980

	Prior to Year of M.D.			1974			1975			1976			1977			1978			1979			1980*		
Years since Graduation				0			1			2			3			4			5			6		
	Number	Percent of Class	Percent of Total Appointments	Number	Percent of Class	Percent of Total Appointments	Number	Percent of Class	Percent of Total Appointments	Number	Percent of Class	Percent of Total Appointments	Number	Percent of Class	Percent of Total Appointments	Number	Percent of Class	Percent of Total Appointments	Number	Percent of Class	Percent of Total Appointments	Number	Percent of Class	Percent of Total Appointments
First Appointments	2	1.1	10.0	1	0.5	5.0	0			3	1.7	15.0	4	2.2	20.0	5	2.8	25.0	3	1.7	15.0	2	1.1	10.0
Cumulative Appointments	*2*	*1.1*	*10.0*	*3*	*1.7*	*15.0*	*3*	*1.7*	*15.0*	*6*	*3.3*	*30.0*	*10*	*5.6*	*50.0*	*15*	*8.3*	*75.0*	*18*	*10.0*	*90.0*	*20*	*11.1*	*100.0*
Final Deactivations	0			0			0			0			2	1.1	10.0	1	0.5	5.0	1	0.5	5.0	3	1.7	15.0
Cumulative Deactivations	*0*			*0*			*0*			*0*			*2*	*1.1*	*10.0*	*3*	*1.7*	*15.0*	*4*	*2.2*	*20.0*	*7*	*3.9*	*35.0*
Balance	2	1.1	10.0	3	1.7	15.0	3	1.7	15.0	6	3.3	30.0	8	4.4	40.0	12	6.7	60.0	14	7.8	70.0	13	7.2	65.0

	Year Unknown		
Years since Graduation			
	Number	Percent of Class	Percent of Total Appointments
First Appointments	0		
Cumulative Appointments	*20*	*11.1*	*100.0*
Final Deactivations	0		
Cumulative Deactivations	*7*	*3.9*	*35.0*
Balance	13	7.2	65.0

APPENDIX III.28

Number and Percent Distribution of 1974 Caucasian Medical Graduates Accepting Medical School Faculty Appointments; Terminating Faculty Appointments; and Balance Remaining on Faculty by Year 1974-1980

	Prior to Year of M.D.			1974			1975			1976			1977			1978			1979			1980*		
Years since Graduation				0			1			2			3			4			5			6		
	Number	Percent of Class	Percent of Total Appointments	Number	Percent of Class	Percent of Total Appointments	Number	Percent of Class	Percent of Total Appointments	Number	Percent of Class	Percent of Total Appointments	Number	Percent of Class	Percent of Total Appointments	Number	Percent of Class	Percent of Total Appointments	Number	Percent of Class	Percent of Total Appointments	Number	Percent of Class	Percent of Total Appointments
First Appointments	11	0.11	1.28	6	0.06	0.70	11			17	0.16	1.98	154	1.49	17.93	226	2.18	26.31	271	2.61	31.55	148	1.43	17.23
Cumulative Appointments	*11*	*0.11*	*1.28*	*17*	*0.16*	*1.98*	*28*	*0.27*	*3.26*	*45*	*0.43*	*5.24*	*199*	*1.92*	*23.17*	*425*	*4.10*	*49.48*	*696*	*6.71*	*81.02*	*844*	*8.14*	*98.25*
Final Deactivations	0			1	0.01	0.12	0			4	0.04	0.47	12	0.12	1.40	32	0.31	3.73	68	0.66	7.92	52	0.50	6.05
Cumulative Deactivations	*0*			*1*	*0.01*	*0.12*	*1*	*0.01*	*0.12*	*5*	*0.05*	*0.58*	*17*	*0.16*	*1.98*	*49*	*0.47*	*5.70*	*117*	*1.13*	*13.62*	*169*	*1.63*	*19.67*
Balance	11	0.11	1.28	16	0.15	1.86	27	0.26	3.14	40	0.39	4.66	182	1.76	21.19	376	3.63	43.77	579	5.58	67.40	675	6.51	78.58

	Year Unknown		
Years since Graduation			
	Number	Percent of Class	Percent of Total Appointments
First Appointments	15	0.14	1.75
Cumulative Appointments	*859*	*8.28*	*100.0*
Final Deactivations	0		
Cumulative Deactivations	*169*	*1.63*	*19.67*
Balance	690	6.65	80.33

IV. COMPARISON OF TRAINING PROGRAMS FOR PHYSICIAN SCIENTISTS

A. Background and Objectives of Study

The National Institutes of Health (NIH) have for many years provided research training to physicians and others by three principal mechanisms:

- a program of extramural postdoctoral (post-MD in the case of physicians) fellowship training at biomedical institutions across the Nation. This program has funded trainees either directly from NIH (individual fellowships) or through grants to institutions (institutional training grants).
- two programs of intramural postdoctoral (post-MD) research training:
  - The research associate program which features one or more years of basic or clinical laboratory research at NIH.
  - the clinical associate program which consists of one year on the clinical research service of the NIH Clinical Center and one or more years in a clinical research laboratory at NIH.

Beginning about 1964 the NIH has also supported a program leading to concurrent MD and PhD degrees. In 1980 this extramural Medical Scientist Training Program (MSTP) of the National Institute of General Medical Sciences (NIGMS) supported about 650 trainees in 25 research-intensive medical schools across the country. Due to the increase in the size of the MST Program and the decline in the number of physicians seeking extramural program fellowships, the MSTP supported one out of every four MD research trainees in 1980. At the same time about 200 research and clinical associate trainees were supported intramurally at NIH and about 1,600 postdoctoral fellows were supported extramurally. The MD-PhD program averages six years in length and includes undergraduate medical

education whereas the postdoctoral fellowships and intramural associate programs average just over two years in length and take place sometime after receipt of the MD degree.

Given the decline since 1974 in numbers of physicians receiving research training; the continuing need for physician scientists, and the limitation of funds available to NIH to support research training, it seems highly appropriate and very timely to compare the efficiency and efficacy of the principal routes for MD research training

The objective of this chapter, therefore, is to compare the MSTP, the NIH intramural clinical and research associate programs and the NIH extramural postdoctoral research fellowship program with respect to the percent of trainees who remain in research, their research productivity as measured by publications, their rate of advance in academic or research positions and their success in obtaining NIH research grant support.

B. Method of Study

The names of all graduates from the MST Program between 1968 and 1973 were obtained; these served as the index group for this study. Exhibit IV.1 shows the schools in which these 53 persons trained and the number graduating in each year. Lists were also obtained from the NIH of all physicians trained as NIH intramural research and clinical associates and as extramural research fellows. These lists were compared with AAMC records of entering medical students. For each of the MST students, a comparable student who subsequently trained in one of the other three programs was found at each medical school. The comparison student was of the same age and sex. He entered the same (or a comparable) medical school with comparable undergraduate education, and with comparable Medical College Admission Test (MCAT) scores, taken at about the same

EXHIBIT IV.1

BASIS OF TRAINING PROGRAM COMPARISONS:

FIFTY-THREE MEDICAL SCIENTIST TRAINING PROGRAM GRADUATES, 1968-1973

	NUMBER OF GRADUATES					
	1968	1969	1970	1971	1972	1973
New York University	1	2	2	3	9	7
Einstein Medical College				2	12	4
Duke University					4	2
University of Wisconsin					1	
University of Pennsylvania					2	1
University of Washington (Seattle)						1
TOTAL	1	2	2	5	28	15

time (≤ 2 years). Comparable medical schools were selected on the basis of similar ownership, region, research intensity and student body composition.

Trainees have continued to graduate since 1973 in ever increasing numbers. However, our comparison is limited to those graduating prior to 1974 in order to provide an adequate period of time (seven years) for graduates to complete residency training and to establish their careers.

There is some inescapable overlap in the training experiences of physicians in the four selected groups. A few MSTP graduates subsequently became NIH research or clinical associates. A few NIH intramural associates at some time also received extramural training. In all such cases, physicians were classified by their earliest research training experience.

All of the 53 earliest MSTP graduates were male. Therefore, only male trainees from the other three programs were selected for purposes of this comparative analysis.

The career records of the 212 physicians in the four groups were sought in several ways. The AAMC Faculty Roster System contained career histories of 73 who are active or former members of U.S. medical school faculties. The most recent American Medical Directory (1979), Directory of Medical Specialists (1979-80), NIH Directory, some research institute staff directories, and city telephone directories (for last known addresses) were also checked to locate as many of the physicians as possible. Letters were sent requesting a Curriculum Vitae (C.V.) and a brief questionnaire was enclosed requesting data about research training and current academic and non-academic activity (Appendix IV.1). Questionnaires were returned by 77 physicians. An attempt was made to verify by telephone the activities of those physicians for whom current data were not available.

The publication records of all 212 physicians were derived by using the MEDLARS computer system of the National Library of Medicine. We collected references to more than 8,000 articles published since 1967 by authors with the same last name and first initial (or initials) as the 212 research trainees in the study cohort. Each reference was verified to be authored by a member of the cohort, or discarded, by a systematic analysis of dates, titles, co-authors and occasional checks against the actual publication in the library or against C.V.'s received. As a result, 2,792 articles were attributed to the physician study cohort.

The records of all research grant applications to NIH and ADAMHA submitted by the 212 physicians were obtained by matching names and birthdates against the NAS/NRC Composite Grant Applicant File. AAMC staff screened these matches for ambiguities and deleted applications for traineeships, non-competing renewals and changes-of-institution. One hundred forty-one applications were retained for comparison among the four groups of physicians. Normalized priority scores were calculated from raw priorities by a method reported elsewhere.* Also, a grant "success" score was calculated using the normalized priority score and assigning a value of 500 if the application was disapproved.

C. Career Comparisons of MD Research Trainees

1. Research and Faculty Status of Trainees. Exhibit IV.2 presents the number and percentage of graduates from each of the four training programs who are currently involved in research, medical teaching (exclusive of research),

* See Sherman, C.R. and Morgan, T.E. Education Patterns and Research Grant Success of Medical School Faculty. Washington, D.C.: AAMC, January, 1979.

EXHIBIT IV.2

RESEARCH AND FACULTY STATUS OF PROGRAM GRADUATES

TRAINING PROGRAMS

	NIGMS Medical Scientist [a]	NIH Intramural Research Associate [b]	NIH Intramural Clinical Associate [b]	NIH Extramural Postdoctoral Fellowship [b]
CURRENTLY INVOLVED IN RESEARCH	39	31	31	25
(as faculty in a medical school, at a research institution, e.g., NIH, or published research articles in 1980)	(74%)	(58%)	(58%)	(47%)
OTHER MEDICAL SCHOOL FACULTY ACTIVITY	8	9	5	8
(e.g., clinical dept. appointment, or research not specified as current activity)	(15%)	(17%)	(10%)	(15%)
PRACTICE	3	2	6	7
(i.e., known to be in practice, exclusive of research and teaching)	(6%)	(4%)	(11%)	(13%)
NO INFORMATION	3	11	11	13
(non-respondent and current activity not discernable from available data)	(6%)	(21%)	(21%)	(25%)
ALL GRADUATES	53 (100%)[c]	53 (100%)	53 (100%)	53 (100%)
Graduates in Research or Teaching as Percent of Graduates With Known Current Career Status	96%	95%	86%	83%

[a] Graduates through 1973.
[b] Comparison group matched with MSTP graduates.
[c] Sums may differ slightly from 100% rounding.

practice (exclusive of research and teaching) and whose current career status is unknown. In interpreting these data, it should be noted that the percentage of physicians whose current status is unknown varies from a low of six percent of the MSTP graduates to 25 percent of the extramural trainees. Thus the reported percentages in the upper rows of the exhibit present a conservative view of the total picture of current research pursuits by the former research trainees. It must be acknowledged, however, that those physicians whom we were unable to locate may be more likely to be in practice than in research. However, during telephone follow-up of non-respondents the percentage on faculty were equal to that in full-time practice. Since the rates of "unknown current activity" varies among the four groups, the bottom row of the exhibit permits a comparison of the percentage of graduates from each program who currently are known to be in research or teaching.

The MST Program has the highest proportion of graduates (74 percent) who could be confirmed as currently involved in research and the largest percentage (74 percent+15 percent+89 percent) confirmed to be in research and/or other academic activities.

After adjusting the data for unknown current activity, the MST and NIH research associates programs share the highest percentages of graduates in research and teaching, 94 percent and 95 percent, respectively. The percentages for NIH clinical associates (86 percent) and extramural trainees (83 percent) are also high.

2. Faculty Rank. Exhibit IV.3 presents the number and percentage of graduates from each program for whom current faculty rank has been ascertained. The mean number of years that elapsed between medical school entry or graduation and first appointment is also shown. Compared to other cohorts of medical school entrants,

EXHIBIT IV.3

FACULTY RANK OF PROGRAM GRADUATES

TRAINING PROGRAMS

	NIGMS Medical Scientist[a]	NIH Intramural Research Associate[b]	NIH Intramural Clinical Associate[b]	NIH Extramural Postdoctoral Fellowship[b]
INSTRUCTOR OR RESEARCH ASSOCIATE	5 (17%)	4 (22%)	6 (23%)	7 (23%)
ASSISTANT PROFESSOR	12 (41%)	11 (61%)	19 (73%)	18 (60%)
ASSOCIATE PROFESSOR	11 (38%)	3 (17%)	1 (4%)	5 (17%)
FULL PROFESSOR	1 (4%)	0 (0%)	0 (0%)	0 (0%)
TOTAL GRADUATES WITH KNOWN FACULTY RANK	29 (100%)	18 (100%)	26 (100%)	30 (100%)
Average Elapsed Time to First Faculty Appointment from Medical school-				
Matriculation (years)	9.7	10.2	10.7	9.6
Graduation	3.7	6.2	6.7	5.6

MSTP graduates join faculties after about the same total time interval. However, these MSTP graduates advanced to the higher academic ranks sooner than did graduates of other programs. Forty-two percent of the MSTP group achieved the rank of associate professor or full professor by 1981, compared with 17 percent of the research associate group, 4 percent of the clinical associate group and 17 percent of the extramural trainee group.

3. Research Grant Applications. The numbers of grant applicants and applications to NIH and ADAMHA from each of the four groups of training program graduates are presented in Exhibit IV.4. Also presented are the number of approved applications, approval rate, and the mean and standard deviation of raw and normalized priority scores and of "success" scores. These statistics are presented both for new applications and for "all" (new and competing renewal) applications.

Of the four research training programs the MST Program has the largest number of graduates (19) who participate in the competition for NIH research support, and they account for the largest number of grant applications (53). All four programs have admirable indicators of successful grant competition. No one group of graduates, however, shows a consistently superior record of grant success over the other groups.

The MST, clinical associate and extramural program participants share high approval rates of both new (79 percent to 85 percent) and all (79 percent to 81 percent) grant applications. (The approval rate of all research grant applications to NIH during these years was about 70 percent.*) The approval rates for former research associates is lowest (78 percent of new, 54 percent of all applications), but they are based on the smallest numbers of applications of all four groups.

* For comparble statistics for a sample of medical school faculty see, Sherman and Morgan (1979), cited above.

EXHIBIT IV.4

NIH GRANT SUCCESS RATES FOR SELECTED GRADUATES
OF FOUR NIH RESEARCH TRAINING PROGRAMS

	TRAINING PROGRAMS			
	NIGMS Medical Scientist[a]	NIH Intramural Research Associate[b]	NIH Intramural Clinical Associate[b]	NIH Extramural Postdoctoral Fellowship[b]
Number of Graduates	53	53	53	53
Number of Grant Applicants	19	11	14	15
New Applications:				
Number	42	23	23	26
Approved	33	12	19	22
Approval Rate	(79%)	(52%)	(83%)	(85%)
Raw Priority Score	216±94[c]	204±106	216±82	226±85
Normalized Priority Score	221±87	204±86	216±54	232±71
"Success" Score[d]	281±139	345±163	274±11[illegible]	273±118
All Applications:				
Number	53	26	32	30
Approved	42	14	26	24
Approval Rate	(79%)	(54%)	(81%)	(80%)
Raw Priority Score	217±93	207±100	224±82	219±85
Normalized Priority Score	223±86	216±87	233±60	224±73
"Success" Score[d]	284±136	347±158	283±119	[illegible]±130

[a] Graduates through 1973.
[b] Comparison group matched with MSTP graduates.
[c] Mean score plus or minus one standard deviation.
[d] "Success" score is equal to normalized score for approved applications, and is equal to 500 for disapproved applications.

Priority scores are scaled such that low scores are "better" than high scores. The range of possible scores is from 100 to 500. Normalized scores have a mean of 250. All four sets of applications, both for "new" and "all" applications, have mean normalized scores somewhat below 250, i.e. better than the average for all applicants. The best (lowest) [illegible] priority scores, both raw and normalized, were for applications from former NIH research associates. (This group, however, also had the lowest approval rates). Due to variability within groups of applications and to small numbers of applications, differences among the average scores are generally not statistically significant.

Overall "success" scores were highly favorable for MST, clinical associate and extramural program graduates. (The average "success" score for all applications, to NIH, assuming a 70 percent approval rate, would be 325). "All" and "new" applications from research associate program graduates had the highest (least favorable) average "success" scores.

4. Published Articles. There are marked differences among the four groups of physicians in the quantity and scientific depth of the articles they publish. Exhibit IV.5 presents the number of authors in each group of 53 physicians and the number of references found in the MEDLARS bibliographic system of the National Library of Medicine to articles that were verified to have been written by the selected graduates of the four research training programs. The 2,792 articles are also classified by the research "level" of the journals in which they were published.*

Of the four groups, graduates of the MST Program are the most prolific authors (995 articles). The matched comparison groups of former extramural

*For a full description of research "level" and its derivation, see Narin, F. Evaluative Bibliometrics. Cherry Hill, N.J.: Computer Horizons, Inc., 1976 (NTIS: RPB 252339/AS)

trainees produced the fewest articles '408). Matched research associates published 716 articles and clinical associates published 673 articles.

All groups published articles in journals of all scientific "levels", but their distributions among the four categories differ substantially. MSTP graduates and matched research associates published predominately in journals characterized by high degrees of scientific rigor, e.g., Journal of Biological Chemistry and American Journal of Physiology. The modal journal category of articles by clinial associates and extramural trainees is "level 2"; journals in this category, such as the New England Journal of Medicine, usually contain a mix of reports on clinical investigation and clinical observation. Of the four groups of trainees, former clinical associates and extramural trainees publish most frequently (16% and 17%, respectively) in journals emphasizing clinical observation, e.g., the Journal of the American Medical Association.

The 2,792 articles tallied in Exhibit IV.5 do not represent the entire published output of the physicians compared in this analysis. Books and chapters in edited volumes will have been overlooked. It is not likely that this will introduce a strong bias in the group comparisons. Nevertheless, since 82 of the physicians have also supplied C.V's with lists of publications, there is now an opportunity, given more time than is now available, to examine the MEDLARS method for possible sources of bias by comparing its results with articles, books, chapters and other publications listed on the C.V.'s.

D. Discussion. In the above section statistical comparisons were made of four groups of physicians who received research training via four different NIH-supported programs. The physicians were carefully matched, using the MSTP graduates as a reference group, for having entered medical school at the same time, having comparable levels of ability (MCAT scores), and having attended the

EXHIBIT IV.5

PUBLISHED ARTICLES BY GRADUATES
OF FOUR NIH RESEARCH TRAINING PROGRAMS

	TRAINING PROGRAMS			
	NIGMS Medical Scientist[a]	NIH Intramural Research Associate[b]	NIH Intramural Clinical Associate[b]	NIH Extramural Postdoctoral Fellowship[b]
NUMBER OF AUTHORS (among 53 graduates in each group)	50	46	51	45
MEDLARS references to articles published in journals at:				
LEVEL 4 (e.g., Amer. Journal Physiology)	519 (52%)	296 (41%)	84 (13%)	31 (8%)
LEVEL 3 (e.g., Journal of Clinical Invest.)	258 (26%)	147 (21%)	170 (25%)	64 (16%)
LEVEL 2 (e.g., N.E.J.M.)	90 (9%)	136 (19%)	218 (32%)	169 (42%)
LEVEL 1 (e.g., J.A.M.A.)	27 (3%)	52 (7%)	108 (16%)	69 (17%)
LEVEL NOT ASSIGNED (e.g., new or obscure journals)	101 (10%)	84 (12%)	93 (14%)	70 (17%)
ALL REFERENCES	995 (100%)	716 (100%)	673 (100%)	408 (100%)

[a] Graduates through 1973.
[b] Comparison group matched with MSTP graduates.

same or a comparable undergraduate medical school. The MSTP group included all of the first 53 successful graduates of this very selective program. Because of of the matching criteria, however, the three comparison groups may not be entirely comparable to all the graduates of each training program.

Given comparable research trainees, all four programs were highly successful in producing physician scientists. Exhibit IV.2 underscores this finding; it also shows that the NIGMS Medical Scientist Training Program was the most successful. Also, by 1981 a significantly larger proportion of MSTP graduates had achieved tenured ranks than those who completed other training programs (Exhibit IV.3). This finding may be due, at least in part, to an advantage conferred by the rigorous research experience required to earn the PhD degree in excellent training programs.

The research grant application statistics (approval rates and priority scores, Exhibit IV.4) show again that all four groups are successful competitors for research support. No one group is superior to the other three on all criteria of grant success. The NIH research associates appear to have the best priority scores but they also have the lowest approval rate for research proposals.

The different publications by the four groups of physician scientists (Exhibit IV.5) show clearly that the four programs have different products. Graduates from the MSTP and matched NIH research associates conduct much basic as well as clinical research. Research by matched NIH clinical associates and matched extramural trainees includes a relatively higher proportion of clinical observations and clinical investigations. The MSTP graduates are the most prolific authors of published research. NIH extramural trainees make notably fewer contributions to the medical and scientific literature.

It should be remembered that during the period of training encompassed by this study (1963 to 1975) some factors that affected career choice were different from those in subsequent years and that this difference may affect the generalizability of these data to the present or future. One factor, the medical military draft and the acceptability of service in NIH associate programs as an alternative to active military duty, probably increased the number of highly qualified candidates for these positions. In those years, the NIH associate programs could be more highly selective than they are now. The MSTP, on the other hand, continues to be highly selective and chooses participants earlier in their medical career, usually upon admission to medical school. Another factor of possible influence on career choice is the absence of research service "payback" for extramural trainees prior to 1975. The effect of "payback" on career planning by today's medical school graduates is shown in Chapter V. to be minimal. Even without the "payback" incentive, extramural trainees may be seen (Exhibit IV.2) to continue their teaching and research involvement at a substantial rate (83% of trainees whose current activity is known, 62% of all trainees).

This last fact is in such striking contrast to "current wisdom" about the career activities of extramural postdoctoral trainees that it deserves corroboration. It has been widely believed, on the basis of anecdotal data, that the majority of such trainees entered practice rather than academic careers in research and teaching. (Indeed, this belief was a major factor in the 1974 addition of the "payback" requirement to the Congressional authority for research training). We have verified the fact that a high percentage of those who received NIH postdoctoral research fellowship support did serve, and continue to serve, in research and teaching positions on U.S. medical school faculties. This verification was accomplished by the simple, direct matching of the names of all recipients

of NIH research training support (through 1975-76) with those listed on the AAMC Faculty Roster file (Exhibit IV.6). Of the 26,307 MDs who received NIH extramural postdoctoral support, 13,527 or 51% were on the Faculty Roster in 1980.* This figure agrees very well with the 47% found (Exhibit I.V.2, row 1, column 4) in the comparison sample of this study. Faculty activity was verified by mail or telephone survey in the comparison sample as 62% of the original sample or 83% of respondents; similar results can be expected for the total population. With the sample data thus verified, one can confidently assert that NIH extramural research fellowship support over several decades has produced researchers and teachers in 62 percent to 83 percent of all those who ever received such support.**

* This match included trainees whose support began prior to 1974 and fellows whose support began prior to 1975 matched with MDs having either active or inactive appointments as indicated on the Faculty Roster in January 1980.

** Comparison of NIGMS MSTP data in Exhibits IV.2 and IV.6 is not valid since most of this predoctoral program's graduates between 1973 and 1975 were still in postdoctoral training status at the time of the match shown in Exhibit IV.6.

EXHIBIT IV.6

OVERLAP OF AAMC FACULTY ROSTER WITH ROSTER OF ALL GRADUATES OF FOUR NIH RESEARCH TRAINING PROGRAMS

	TRAINING PROGRAMS			
	NIGMS Medical Scientist[a] (predoctoral)	NIH Intramural Research Associate[b] (postdoctoral)	Clinical Associate[b] (postdoctoral)	NIH Extramural Fellowship[b] (postdoctoral)
Number of Physicians Trained	126	743	1,591	26,307
Number of Physicians on Faculty Roster	38	393	804	13,527
Percent of Trainees on Faculty Roster	30%	53%	51%	51%

[a] Graduates through 1975, see text for explanation and caveat.
[b] Trainees through 1976.

APPENDIX TO CHAPTER IV

aamc association of american medical colleges

January 22, 1981

Dear Colleague:

The Association of American Medical Colleges (AAMC) is engaged in a study of several routes by which physicians obtain research training to prepare them to provide exemplary patient care, conduct clinical and basic research, and serve as faculty members in American medical schools. The study is focused on the NIH Clinical Associate Program (intramural), the NIH Research Associate Program (intramural), the NIH Medical Scientist Training Program (extramural) and all other extramural, post-MD, research fellowship programs supported by NIH.

As a result of a careful selection and matching process, you are one of 216 physicians chosen who had one or more of the training experiences we are studying. Because of the small, carefully balanced sample of program participants, it is imperative that we achieve a high rate of cooperation. I urge you to assist in this worthwile endeavor simply by 1) providing us with your Curriculum Vitae (C.V.) that accurately and completely reflects your medical career, and 2) completing the enclosed one-page form.

We expect that some of you are not now pursuing research careers. If this is the case we are interested in knowing whether your research experiences benefited your medical practice and whether your practice is occasionally related in any way to research projects. Also, we would like to know about all research training you received and, if possible, the sources of support for each research experience. If you have pursued an academic medical career, we would like to know the institutions and dates of your successive appointments. We would also like a listing of your publications. No doubt, most of this information is contained in your C.V., but if it is not, please complete the applicable portions of the attached form.

The data you provide will be treated confidentially by the AAMC. Only aggregate statistics that do not identify you will be publicly reported. The results will be used in turn by the AAMC, the National Academy of Sciences and the National Institutes of Health to help in the development of clinical research manpower training policies and programs.

I hope that you will be willing to participate in this important study. A pre-addressed, pre-paid envelope is enclosed for your C.V. and other responses. If you have any questions about this survey please telephone Dr. Charles Sherman (202-828-0429) or Dr. Thomas Morgan (202-828-0480) collect.

Sincerely,

John A. D. Cooper

John A. D. Cooper, M.D.

Suite 200/One Dupont Circle, N.W./Washington, D.C. 20036/(202) 828-0400

PLEASE COMPLETE ANY ITEMS THAT ARE NOT COVERED COMPLETELY ON YOUR C.V.

A. RESEARCH TRAINING-List post-MD research fellowships and training experiences.

Type of experience	Dates	Institution	Source of support
(e.g., research "fellowship"	"1975-76"	"Duke"	"NIH")
1.			
2.			
3.			

B. RESEARCH GRANTS AND SUPPORT-List research grants and research contracts.

Type	Dates/ Duration	To Institution	Source
(e.g., "single investigator"	"1977-80"	"Duke"	"NIH")
1.			
2.			
3.			
4.			

C. PUBLICATIONS-Attach list of all publications (research and non-research)

D. ACADEMIC CAREER-List all faculty positions held

Rank/Title	Department	Dates	Institution
(e.g., "Asst. Prof."	"Medicine"	"1971-72"	"Duke Med. Center")
1.			
2.			
3.			
4.			

E. Please comment on how you believe research training and experience has affected your medical career. (Use reverse if necessary)

V. MD GRADUATES OF 1980 AND THEIR PLANS FOR RESEARCH INVOLVEMENT

A. Background

In December 1979, the AAMC distributed an extensive Graduation Questionnaire to all senior medical students. Responses were received from 10,215 students, 67 percent of all seniors who were expected to graduate in 1980.

The responses to the Graduation Questionnaire were matched with records of answers provided by each student to a questionnaire administered with the Medical College Admissions Test (MCAT), the individual's MCAT scores, and with records from the application for admission to medical school.

The following analyses of questions related to research ambitions, factors that affect career plans and measurements of personal ability provide information that may contribute to the discussion and recommendations of the Clinical Sciences Panel. General questions addressed here include:

(Section B) Who are the people interested in research and how are they different from those who are not interested in research?

(Section C) How many students view research-related careers as their "second choice?" How do they differ from students choosing research careers "first" and from those excluding research from both first and second choice career plans? How do these three groups differ in ability, in accumulated debt, and in attitudes toward "payback" and other factors that may affect choice of research involvement?

(Section D) Is research interest stable from application to medical school through graduation, and, if not, are there medical school experiences that might explain this change?

(Section E) What effect does having a PhD before entering medical school have on research plans at graduation? How many PhDs-turned-MD graduate annually from U.S. medical schools and how do their research plans differ from students who earn their PhD while in medical school or from students who do not earn PhDs?

(Section F) What are the career plans of students planning to seek research fellowships? How are perceptions of available research training support related to plans to seek a research fellowship?

(Section G) How does the proportion of graduating medical students in 1980 favoring research compare with the proportions in 1960 and in other recent years (1978, 1979) for which comparable data are available?

B. Expressions of Research Interest

Several questions on the AAMC Graduation Questionnaire permitted students to express varing degrees of interest in research-involvement in their ensuing careers. Responses to these questions indicate the current thinking of graduating seniors and are, for each individual, subject to change as each career evolves. Aggregated responses, however, are predictive of the behavior of the entire group. Section G summarizes previous data comparing medical research career plans and outcomes.

In question 21, students were asked to indicate their first, second and third preference for alternative careers. The first four response alternatives indicate research interests:

21. Please indicate your first, second and third preferences for the different career activities listed below by writing their code numbers on the lines below:

first choice: (___ ___)

second choice: (___ ___)

third choice: (___ ___)

Full-time academic faculty appointment:
(01) basic science teaching and research (e.g., anatomy, biochemistry)
(02) clinical science teaching and research, including patient care (e.g., internal medicine, surgery)

Salaried research scientist (e.g., in pharmaceutical industry, federal agency, state agency):
(03) basic medical sciences
(04) clinical sciences

Private clinical practice (e.g., in a private office, paid by fee-for-service):
(05) alone
(06) in partnership with one other physician
(07) in a group of 3 or more physicians
(08) undecided among 5, 6 and 7

Salaried clinical practice, employed by:
(09) hospital
(10) prepaid group clinic
(11) state or federal agency (e.g., VA, Armed Forces, Public Health Service)

(12) Administration - No practice (e.g., hospital administrator, state or federal agency administrator, association or academic executive, business executive).

The numbers and percentages of people giving each possible response for first, second, and third choice are tabled in Appendix V.1 following this chapter. In summary, 21.8 percent checked one of the four research categories as their first choice; 12.2 percent checked a research category as their second choice but not as first; 66.0 percent checked only the clinical practice categories as first and second choices. These three groups of graduating seniors are compared statistically in this chapter of the report. The second group of graduates, those giving research as their second but not

least preference, may be of particular interest. This group may be most susceptable to influences targeted to increase the pool-size of future clinical investigators.

A second question, Question 19a&b, indicates students preferred degree of involvement in future research:

III. POST GRADUATE CAREER PLANS

19a. How extensively do you expect to be involved in research during your medical career *(Circle only one code number)*:

(1) exclusively
(2) significantly involved (several years set aside for full-time research or 25% or more of continuous career devoted to research pursuits)
(3) somewhat involved (one year or less set aside for research or less than 25% of continuous career)
(4) involved in a limited way (e.g. occasional cooperation with clinical trials of new drugs or medical devices in my practice)
(5) not involved

b. How extensively would you like to be involved in research during your medical career (Indicate one of the above code numbers):

(___)

(Appendix V.2 provides counts and percentages of students giving each response.) Very few 1980 graduates (0.3 percent) expect to be exclusively involved in research during their medical careers; they would be about 47 of the 15,250 graduating MDs in 1980. Another 9.2 percent expect to be significantly involved, defined as "several years set aside for full-time research or 25 percent or more of continuous career devoted to research pursuits."

Another 28 percent of 1980 graduates expect to be somewhat involved, that is, "one year or less set aside for research or less than 25 percent of continuous career in research." Thus 37.5 percent of students expect to be involved for one or more years (the first three categories of response) during their medical careers. Another 45.8 percent expect limited involvement through clinical trials or drug testing as part of their practices. Finally, 15.3 percent expect no involvement, and 1.4 percent did not respond to the question.

There is a strong correspondence between the degrees students expect and desire research involvement, but many students (16 percent of those responding to both halves of the question) expressed a desire for a higher level of research involvement than they expect to be able to achieve.

The correspondence between type of research involvement (Question 21.1, "First Choice") and expected degree of involvement (Question 19a) is presented in Exhibit V.1. Those expecting exclusively research careers are those who choose academic settings and predominantly basic science fields. Of the students foreseeing academic clinical science careers, 48 percent see themselves "somewhat involved" (less than 25 percent of their time) in research.

In the above paragraphs we defined three groups of graduating seniors according to their first and second choices of career alternatives. For brevity in the following sections presenting statistical comparisons and discussion, we will refer to the three groups as:

EXHIBIT-V.1

NUMBER OF 1980 GRADUATING MEDICAL STUDENTS INDICATING DEGREE OF EXPECTED RESEARCH INVOLVEMENT, BY "FIRST CHOICE" TYPE OF CAREER

		"FIRST CHOICE" CAREER TYPE					
		Basic Science Research and/or Teaching		Clinical Science Research and/or Teaching		Practice or Administration (8 categories combined)	All
		Academic	Non-Academic	Academic	Non-Academic		
DEGREE OF INVOLVEMENT IN RESEARCH*	Exclusively	16**	1	6	1	2	26
	Significantly	42	1	741	17	116	917
	Somewhat	17	3	983	15	1807	2825
	Limited	5	4	260	2	4384	4655
	None	1	0	28	0	1506	1535
	Total	81	9	2018	35	7815	***9958

*For definitions, see text.
**For population estimates, multiply number of students by 1.53
***257 cases missing one or both responses

I.	Research Firsts	2,199	21.8%
II.	Research Seconds	1,237	12.2%
III.	Non-researchers	6,657	66.0%
Total of classified respondents		10,093	100.0%

C. Shift in Research Career Attitudes During Medical School

How stable are research interests between application to medical school and graduation? Are changes in attitude related to the type of school environment? The matching of answers given before medical school with answers given to the Graduation Questionnaire permits an answer to these questions. Exhibit V.2 tabulates responses given to the MCAT Questionnaire against responses given at the end of medical school. Students whose early plans included research but who, at graduation from medical school, chose research careers second (2.6 percent) or not at all (10.1 percent) may constitute a loss to research (sum equal 12.7 percent). Their number is approximately balanced, however, by people adopting a career posture favorable to research during medical school (12.9 percent). The Research Seconds at graduation are predominately (931/1179 = 79.0 percent) people who had no research plans when they entered medical school. However, Research Firsts are also largely from the group of matriculants who had no research plans (1221/1973 = 61.9 percent).

The influence of medical school environment on change in attitude toward research may be examined using these data. All responding students may be classified into one of four categories depending upon whether their career plans before and after medical school showed a shift toward research, a shift away from research, constant plans that include research, or constant non-

EXHIBIT V.2

RESEARCH CAREER PREFERENCES
BEFORE AND AFTER MEDICAL SCHOOL

	1980 GRADUATION CAREER CHOICE GROUP			
	I RESEARCH FIRSTS	II RESEARCH SECONDS	III NON-RESEARCH	ALL
PRE-MEDICAL CAREER PLANS:				
RESEARCH *	752	248	957	1,957
	7.9%	2.6%	10.1%	20.6%
NON-RESEARCH **	1,221	931	5,376	7,528
	12.9%	9.8%	56.7%	79.4%
Totals	1,973	1,179	6,333	9,485
	20.8%	12.4%	66.8%	100.0%

* Indicated "research and/or teaching," "combination of specialty practice, research and/or teaching" or "MD technologist/scientist" MCAT Questionnaire

** Indicated "general practice," "specialty practice," "administration," "other" or "undecided" on MCAT Questionnaire

research career plans. Further, medical schools may be classified according to their research activity as either "research intensive" or "other."* The numbers in each category attending research intensive medical schools and other medical schools is presented in Exhibit V.3.

The percentage of students attending research intensive schools who held research ambitions throughout medical training (13.5 percent) is nearly twice the corresponding percentage of students at other schools (7.0 percent). The percentage shifting toward research is also higher at research-intensive schools than at other schools (27.3 percent vs. 12.1 percent). However, the percentage shifting away from research is also higher at research-intensive schools (14.8 percent vs. 12.4 percent at other schools). But the balance is a small net shift toward research at research-intensive and a very small net shift away from research at other schools.

D. Comparisons of Future Clinical Researchers and Non-researchers

In this section the three career-choice groups, Research Firsts, Research Seconds and Non-researchers are compared on biographical characteristics, medical school environment, research experiences during medical school, accumulated debt, and relative personal importance of factors that affected their career choices. In Section C, above, their career plans are compared with their career plans expressed when applying to medical school. In Section F their career plans are compared with their plans to seek a postgraduate research fellowship.

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* All medical schools were divided into two groups based on a somewhat arbitrary criterion of research intensiveness. One group included the fifteen institutions with the highest expenditures for sponsored research reported on the 1975-1976 Liaison Committee on Medical Education Annual Medical School Questionnaire, Part I, Annual Report on Medical Schools Financing. The other group included all other U.S. medical schools. This is the same grouping used by C.R. Sherman and T.E. Morgan in a previous study, "Education Patterns and Research Grant Success of Medical School Faculty," Washington, D.C.: AAMC, January 1979.

EXHIBIT V.3

SHIFT IN RESEARCH CAREER ATTITUDE BY RESEARCH INTENSIVENESS OF MEDICAL SCHOOL ATTENDED

		TYPE OF MEDICAL SCHOOL ATTENDED		
		RESEARCH INTENSIVE*	OTHER	ALL
SHIFT IN RESEARCH CAREER PLANS DURING MEDICAL SCHOOL:	Constant Research	N 187	565	752
		% 13.5	7.0	7.9
	Toward Research	N 239	982	1221
		% 17.3	12.1	12.9
	Away From Research	N 204	1001	1205
		% 14.8	12.4	12.7
	Constant Non-research	N 751	5556	6307
		% 54.4	68.6	66.5
	Total	N 1381	8104	9485
		% 100.0	100.0	100.0

* For definition, see text.

1. Medical College Admissions Test (MCAT) The three groups differ significantly in their mean MCAT scores. The group means are tabled in Exhibit V.4. The Research First group has the highest mean and the Research Second group has the second highest mean for all four tests;

2. Parents' Education As is commonly observed, medical students are likely to be the children of parents with high levels of education. Students with expressed research ambitions are slightly more likely than other students to come from families at the highest education levels. The percentages of students having parents at each educational level are tabled in Exhibit V.5.

3. Gender There is no statistically significant difference between the sexes regarding preferences for research careers. Seventy-seven percent of responding senior medical students are male, 23 percent are female. The Research Firsts group and the Research Seconds both included 76 percent males and 24 percent females. The "Non-research" group was 77.7 percent males and 22.3 percent females.

4. Race Graduating medical students who are American Indians, blacks and Mexican Americans are less likely than whites (16.7 percent, 1.4 percent, 9.8 percent vs. 21.9 percent, repectively) to be interested in research careers as their first choice. They are also less likely to include research as their second choice careers (11.9 percent, 8.3 percent, 11.1 percent vs. 12.2 percent). Compared with white students, however, students of Asian Pacific heritage and Hispanic backgrounds (other than Mexican-American) are more likely to express interest in research careers as their first choice (25.5 percent, 23.9 percent vs. 21.9 percent). The percentages of Asian Pacific and "other" Hispanic students choosing research careers "second" are 11.1 percent and 19.2 percent.

EXHIBIT V.4

MEAN MCAT SCORES FOR THREE GROUPS
OF
GRADUATING MEDICAL STUDENTS

	CAREER CHOICE GROUP			
	I RESEARCH FIRSTS	II RESEARCH SECONDS	III NON RESEARCH	F (df=2 & 9510)
MCAT-Verbal	591	577	568	60.1
MCAT-Quantitative	653	637	631	55.4
MCAT-General	567	556	545	66.8
MCAT-Science	637	624	615	71.7

All F-values are significant at $p<.0001$

EXHIBIT V.5

EDUCATION LEVELS OF PARENTS OF THREE GROUPS OF GRADUATING MEDICAL STUDENTS (Percentages)

	CAREER CHOICE GROUP			
	I RESEARCH FIRSTS	II RESEARCH SECONDS	III NON RESEARCH	ALL
FATHERS' EDUCATION				
8th Grade	4.3	3.8	5.7	5.1
Some H.S.	4.0	3.7	5.0	4.6
H.S. Grad.	13.4	12.8	14.6	14.1
Tech/Bus.	3.6	3.9	4.5	4.2
Some College	12.8	15.1	13.3	13.4
College Grad.	19.2	19.5	20.4	20.1
Graduate/Prof.	42.3	40.7	36.3	38.0
Other	.3	.5	.1	.3
TOTAL	100.0	100.0	100.0	100.0
(Numbers of Students)	(1971)	(1177)	(6330)	(9478)
MOTHERS' EDUCATION				
8th Grade	2.7	3.1	3.4	3.2
Some H.S.	4.3	3.4	4.5	4.3
H.S. Grad.	25.5	25.2	26.2	25.9
Tech/Bus.	6.4	8.1	7.1	7.1
Some College	19.5	17.7	19.3	19.2
College Grad.	22.0	22.4	24.1	23.5
Graduate/Prof.	19.0	19.1	14.9	16.3
Other	.6	.6	.5	.5
TOTAL	100.0	100.0	100.0	100.0
(Numbers of Students)	(1969)	(1178)	(6326)	(9473)

5. Medical School . Research-oriented medical students are proportionally more likely to be graduating from privately-owned medical schools. Exhibit V.6 presents the numbers and percentages of the three groups of students graduating from public and from private schools.

Research-oriented medical school seniors are also relatively more concentrated in research intensive medical schools. (Research intensive is defined in Section III.C above). However, 78 percent of medical students with research career plans earn their MDs at "other" medical schools. Exhibit V.7 presents the numbers and percentages of students in the three career choice groups graduating from both groups of schools.

6. Experiences During Medical School Twenty-four percent of all graduating seniors reported having participated in a research project as an investigator during medical school. Of the Research Firsts, 45.3 percent reported such an experience, compared with 24.2 percent of the "Research Seconds" and 16.3 percent of the "Non-research" career-oriented graduates.

Fifteen percent of all graduates in 1980 were sole or joint authors of research papers during medical school. For the three career groups the percentages are "Research Firsts," 31.4 percent; "Research Seconds," 15.0 percent; "Non-research," 9.9 percent.

Students with first-choice research plans at graduation were more likely to indicate a "major emphasis" given to research technique in the instructional programs of their medical schools (9.5 percent of "Research Firsts," 3.3 percent of "Research Seconds," 2.7 percent of "Non-research" graduates). These data are not surprising. Of greater interest may be the observation that 73 percent of the Research Firsts (and 81.3 percent of all graduating seniors) report "none" or "minor" to describe the emphasis given to research techniques in their educational programs during medical school.

EXHIBIT V.6

RESEARCH CAREER ORIENTATIONS OF
RESPONDING 1980 MEDICAL SCHOOL GRADUATES
BY PUBLIC VS. PRIVATE SHCOOL OWNERSHIP

	CAREER CHOICE GROUP			
	I RESEARCH FIRSTS	II RESEARCH SECONDS	III NON-RESEARCH	ALL
Private	1,173	539	2,444	4,156
	53.3%	43.6%	36.7%	41.2%
Public	1,026	698	4,213	5,937
	46.7%	56.4%	63.3%	58.8%
All Schools	2,199	1,237	6,657	10,093
	100.0%	100.0%	100.0%	100.0%

EXHIBIT V. 7

RESEARCH CAREER ORIENTATION OF
1980 MEDICAL SCHOOL GRADUATES BY
RESEARCH INTENSIVENESS OF MEDICAL SCHOOL

	CAREER CHOICE GROUP			
	I RESEARCH FIRSTS	II RESEARCH SECONDS	III NON-RESEARCH	ALL
Research Intensive* Medical School	484	197	824	1,505
	22.0%	15.9%	12.4%	14.9%
Other Medical Schools	1,715	1,040	5,833	8,588
	78.0%	84.1%	87.6%	85.1%
All Schools	2,199	1,237	6,657	10,093
	100.0%	100.0%	100.0%	100.0%

*For definition, see text.

7. Debt It is commonly understood that the early and lifelong earnings of academic physicans is less than the comparable average earnings of physicians who do not serve on medical school faculties. One personal factor that may influence a student's decision to opt against an academic career is a high level of debt accumulated before medical school graduation. Personal debt information was collected from graduating seniors in the following format:

32a. Please indicate below the amounts of any educational loans which either you or your spouse (or spouse-to-be) are legally required to repay. *(Where none, please indicate with a zero):*

	You	Your Spouse or Spouse-to-be
Loans for premedical education/college	$_____	$_____
Loans for medical school	$_____	$_____
Total	$_____	$_____

b. If you received any scholarships for your medical school training, please indicate the types (do not indicate loans) by circling the code numbers of all which are applicable:

(1) Armed Forces
(2) NHSC (PHS)
(3) State (please specify the state using the State Code List on page 3: _____)
(4) School-awarded
(5) Other *(please specify:* _____)

The average of the sum total debt for "you" and "your spouse or spouse-to-be" for 4,230 seniors reporting such data in 1980 is $14,638. (This average includes students reporting zero debt and is therefore less than the $17,736 average reported elsewhere* that includes only non-zero debts). Exhibit V.8 presents the mean debts for each of the three career choice groups Those indicating research careers as their second choice have an average debt of about $1,000 more than those choosing research careers "first." Non-researchers have the lowest average level of debt upon graduation. The difference between Research Firsts and Research Seconds is small (and not statistically significant) relative to the absolute level of debt. These data do not indicate an economic disincentive against research for students with some interest in research careers but with uncomfortable levels of accumulated educational debts at graduation from medical school. Analysis of other questions ir the next section of this chapter shed additional light on the relative importance of financial consideration as research career incentives and disincentives.

8. Factors that Influence Research Career Choice In the following format, all graduating senior medical students were asked to indicate the degree of influence each of nine factors played in their current expectations of research involvement during their ensuing medical careers:

* AAMC 1980 Medical Student Graduation Questionnaire Survey Summary Report for all Schools, distributed to medical school deans.

EXHIBIT V.8

MEAN ACCUMULATED DEBT OF 1980
MEDICAL SCHOOL GRADUATES BY CAREER CHOICE

	CAREER CHOICE GROUP			
	I RESEARCH FIRSTS	II RESEARCH SECONDS	III NON-RESEARCH	ALL
Number of Students Reporting	865	513	2,852	4,230
Mean Debt ($)	15,163	16,003	14,233	14,638
Standard Deviation	14,406	14,774	14,246	14,343

20. How much influence did each of the following factors have on your expectations of personal research involvement *(Circle one number for each factor):*

		Influence on Expectations for Research Involvement			
		Major	Moderate	Minor	None
(01)	research experience while a pre-medical or medical student	3	2	1	0
(02)	financial disadvantages of research career	3	2	1	0
(03)	challenge of search for new knowledge	3	2	1	0
(04)	societal need for practitioners	3	2	1	0
(05)	availability of research training support	3	2	1	0
(06)	obligation to "pay back" research training support by continued research activity	3	2	1	0
(07)	uncertain availability of research funds after completion of training	3	2	1	0
(08)	increasing frustrations of researchers in conducting clinical research	3	2	1	0
(09)	opportunity to work in academic community	3	2	1	0
(10)	other factors *(please specify:* _____	3	2	1	0

The question does not ask the student to specify whether a given factor was a positive or negative influence, only whether it was of "major," "moderate," "minor" or no concern. The ordered response categories permit the calculation of a simple scale of relative influence on which to compare the nine factors. (The scale value is the average of the response values ranging from 3, "major," to 0, "none.") The scale values are calculated separately for each of the three career choice groups. It may be cautiously assumed that the factors with high average influence scale values were generally viewed as positive influences, e.g., that perceived "societal need for practitioners" was a relatively important factor positively influencing the choice of the Non-research career group to eschew research, since this group gave this factor the highest value

on the scale, above all other factors. They also gave "societal need for practitioners" a higher scale value than did either the Research Firsts or Research Seconds.

Exhibit V.9 presents the nine factors that may influence research participation, scaled for each of the three career-choice groups. (See Appendix V.3 for statistical details for Exhibit V.9.) The factors are here discussed in the order of scaled importance to the Research First graduates.

(1) "Major" to "Moderate" Importance

- Opportunity to work in academic community
- Challenge of search for new knowledge
- Research experience while a premedical or medical student

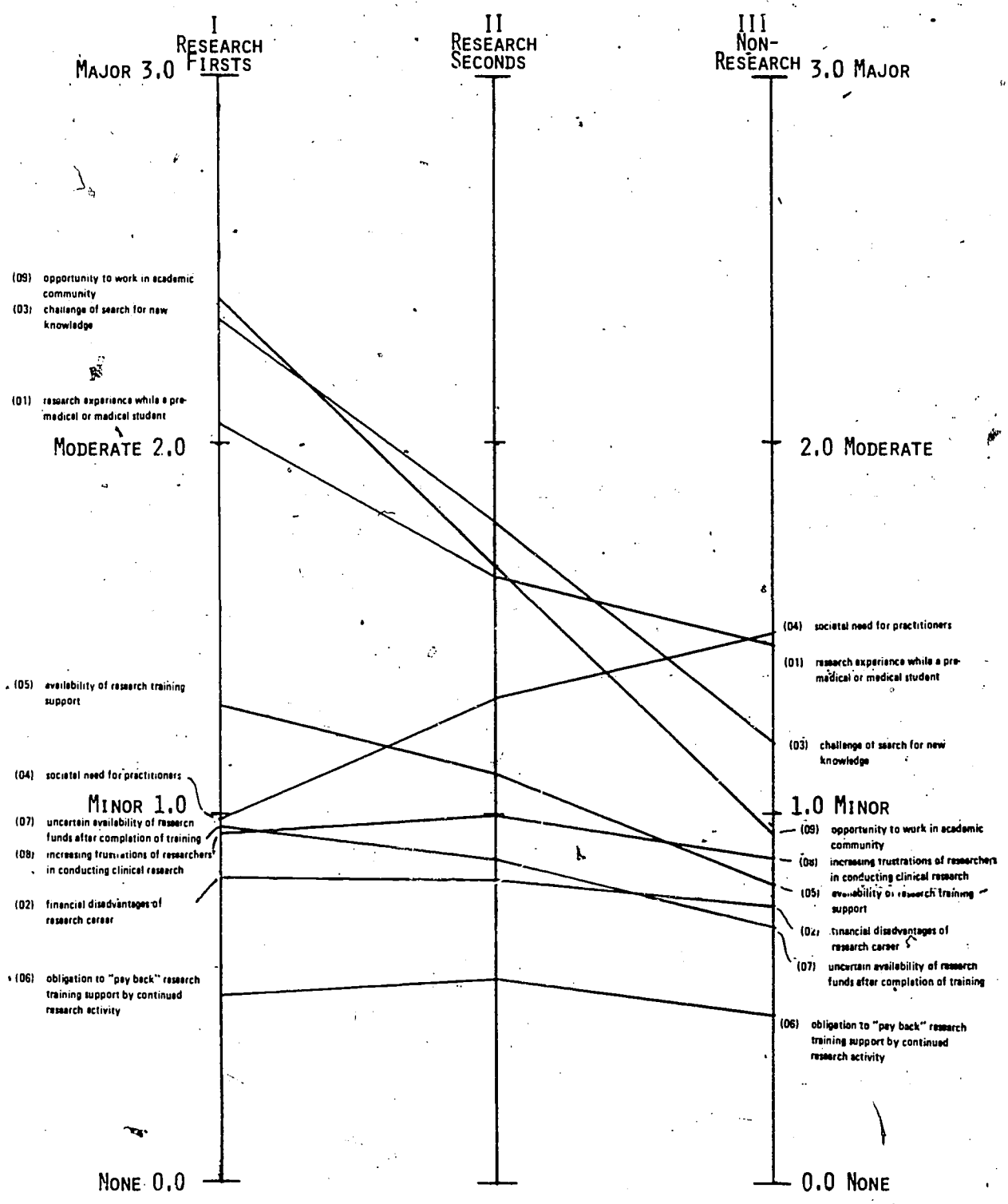
These three factors were of highest importance to both the Research Firsts and Research Seconds. They were significantly more important, however, to the Research Firsts than to the Research Seconds who scaled them all to be of "moderate" importance. "Research experience while a student" was of relatively high (albeit "moderate") importance to the Non-researchers. Could it be that, for them, the research experience was not a happy or fulfilling one?

These findings underline the importance of providing undergraduate medical students with the time and opportunity to try research, and of providing students with a clear understanding of the prospects for and rewards of academic employment.

EXHIBIT V.9

SCALED INFLUENCE OF NINE FACTORS THAT AFFECT EXPECTATIONS OF RESEARCH INVOLVEMENT, BY CAREER-CHOICE GROUPS OF 1980 MEDICAL SCHOOL GRADUATES

CAREER CHOICE GROUP



(2) "Moderate" to "Minor" Influence

- Availability of research training support

The "availability of research training support" (and, presumably, not the lack thereof) is fourth on the scale of important factors influencing the choice to proceed with a research career. It may be inferred that a loss of such opportunities could diminish the already small proportion of graduates proceeding on to research careers.

(3) "Minor" to "No Importance"

- Societal need for practitioners
- Uncertain availability of research funds after completion of training
- Increasing frustrations of researchers in conducting clinical research
- Financial disadvantages of a research career
- Obligation to "pay back" research training support by continued research activity

Except for "societal need for practitioners," these factors were all scaled to be of "minor" or "no importance" by all three career-choice groups. These results will be surprising to many people who have suggested these factors as hypotheses to explain declining participation of physicians in research.

E. Career Plans of MD-PhDs and PhD-MDs

As the average time in medical education and specialty training has lengthened, fewer MDs have been seeking additional training in research. Some students, however, obtain research training in special MD-PhD programs

during medical school. Increasing numbers of medical school applicants who hold PhD degrees are being admitted even though the proportion of PhDs among applicants remains stable at about two percent. It is therefore important to ask about the potential research contributions of the PhD-turned-MD.

How do the career plans of graduating medical students who held PhD degrees before they entered medical school differ from the career plans of students who earned PhD degrees concurrently with their MD degree? Do they differ from the plans of graduating students who do not have PhD degrees? How many such PhD-MDs and MD-PhDs graduated from all medical schools in 1980?

Approximately 263 PhDs graduated from medical school in 1980. This estimate is based on 161 Graduation Questionnaire respondents from schools other than the University of Miami School of Medicine, an overall response rate of 67 percent, and the size of the special program at Miami that recruits PhDs for medical training (23 graduates per year).

Approximately 128 concurrent MD-PhDs were awarded in 1980. This estimate is based on 86 Graduation Questionnaire respondents (excluding 8 others who had PhDs when they matriculated in medical school but erroneously reported graduating from a joint-degree MD-PhD program), and an overall response rate of 67 percent. It is known from the National Institute of General Medical Sciences that 102 Medical Scientists Training Program (MSTP) participants anticipated graduation in 1980. Thus it appears that the MSTP is now supporting about 80 percent of all concurrent MD-PhD graduates nationally.

The career plans of graduating MDs, concurrent MD-PhDs, and PhDs who are now, subsequently, receiving MD degrees are presented in Exhibit V.10. It appears that MD-PhD graduates from MSTP schools are most

EXHIBIT V.10

CAREER PLANS OF RESPONDING 1980 GRADUATING MEDICAL STUDENTS, BY GRADUATE AND PROFESSIONAL DEGREES HELD

		CAREER CHOICE GROUP I RESEARCH FIRSTS	II RESEARCH SECONDS	III NON RESEARCH	ALL*
MD-PhD from school with MST Program**	N	54	0	1	55
	%	98.2	.0	1.8	100.0
MD-PhD from non-MSTP medical school**	N	28	0	3	31
	%	90.3	.0	9.7	100.0
PhD-MD from all medical schools except Miami	N	85	12	63	160
	%	53.1	7.5	39.4	100.0
MD only, all schools	N	2025	1224	6582	9831
	%	20.6	12.5	67.0	100.0
Total	N	2192	1236	6649	10,077
	%	21.7	21.3	66.0	100.0

*Excludes 135 responding seniors for whom there was no record of previous degrees held, and 3 graduates of Miami program

**Excludes 8 responding seniors who held PhD before entering medical school but who reported earning MD-PhD in a joint degree program.

likely (98 percent) to be planning on research careers. MD-PhDs from other schools are also highly likely (90 percent) to choose careers that will include research. PhDs who subsequently earn MDs are roughly half as likely as concurrent MD-PhDs to select research career plans first (53 percent), but they are over twice as likely to choose research than are 1980 graduates with MD degrees only (21 percent)

Thus, of all 1980 medical school graduates with doctorate level research training and with career plans that include research, approximately 129 are concurrent MD-PhDs and 139 are PhD-MDs (assuming 53 percent of the 263 graduating PhD-MD plan research).

The number of graduating new physicians who expect to seek research training through fellowships is examined in the next section.

F. Plans For Research Fellowships

Graduating medical students were asked in the following format to indicate whether they plan to seek post graduate research training:

14. Do your graduate medical education plans include a research fellowship *(Circle one)*:

(1) Yes
(2) No

If yes, on which one of the following areas will it focus *(Circle only one code number)*:

(1) basic medical sciences
(2) clinical medicine
(3) health care delivery and/or social services
(4) a combination of two or more of the above
(5) undecided
(6) other *(please specify:* _____ *)*.

Over one-fourth (27.8 percent) of all responding students responded "Yes." This would indicate that, nationally, approximately 4,200 new MDs are potential applicants for future research fellowships.

The areas of focus of the research fellowships to be sought by the 2,839 responding seniors would be in:

(1)	Basic medical sciences	8.5%
(2)	Clinical medicine	50.1%
(3)	Health care delivery and/or social services	1.9%
(4)	A combination of two or more of the above	26.0%
(5)	Undecided	10.2%
(6)	Other	1.8%
(7)	No response	1.5%

Most of the seniors indicating plans for a research fellowship also indicated that their "first choice" career plans include research, but, as Exhibit V.11 shows, research training will also be sought by others with primarily practice career plans. The availability of research training support was indicated by all three career choice groups to be of generally "minor" concern as a factor influencing their career plans (section D.8).

G. Research Career Preferences of the Graduation Classes of 1960, 1978, 1979 and 1980

The AAMC Graduation Questionnaire has been administered annually since 1978. Although it has been modified each year, each version has had at least one question that allows students to indicate a preference for a career that will include research activities. Similar questions were posed to the entire graduating classes of a sample of 28 medical schools in 1960. Responses to these questionnaires, taken together,

EXHIBIT V.11

CAREER PLANS AND RESEARCH
FELLOWSHIP PLANS OF 1980
MEDICAL SCHOOL GRADUATES

		CAREER CHOICE GROUP			
		I RESEARCH FIRSTS	II RESEARCH SECONDS	III NON RESEARCH	ALL
POST GRADUATE PLANS INCLUDE RESEARCH FELLOWSHIP:	YES	N 1506	415	884	2805
		% 69.3	34.2	13.4	28.1
	NO	N 666	797	5701	7164
		% 30.7	65.8	86.6	71.9
	Total	N 2172	1212	6585	9969
		% 100.0	100.0	100.0	100.0

permit an assessment of changing student attitudes toward research careers.

In 1960, 39.0 percent of 2,209 graduating seniors checked "research and/or teaching" or "combination of specialty practice, research and teaching." Additional data describing the Class of 1960 throughout their careers are available in the AAMC Archives, but the most recent study comparing career preferences at graduation with career performance after seventeen years was reported in 1979.* The study found that only 44 percent of the 1960 graduates expressing research plans did eventually conduct and publish research, and 8.3 percent of those without research plans published research in addition to carrying on medical practices.

The classes of 1978, 1979 and 1980 compare as follows:

Graduation Class	Percent Favoring Research Careers
1978	22.4
1979	20.3
1980	21.8

There is no clear trend in the last three years, but for all three recent years, the level of research interest is noticeably less than it was in 1960. The percentage of these who will fulfill their expressed plans is unknown, but it would have to be a very high proportion to result in the same level of research participation as the Class of 1960.

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* Sherman, C.R. and Morgan, T.E. A Prospective Study of Physicians and Research Careers, Washington, D.C.: AAMC, July, 1979. Soon to be republished by the Analysis and Evaluation Branch, Office of the Director National Institutes of Health.

APPENDICES

V.1 - V.3

III. POST GRADUATE CAREER PLANS

	ALL SCHOOLS Number	Percent
19a. How extensively do you expect to be involved in research during your medical career (Circle only one code number):		
1) exclusively	26	0.3
2) significantly involved (several years set aside for full-time research or 25% or more of continuous career devoted to research pursuits)	938	9.2
3) somwhat involved (one year or less set aside for research or less than 25% of continuous career)	2857	28.0
4) involved in a limited way (e.g. occasional cooperation with clinical trials of new drugs or medical devices in my practice)	4681	45.8
5) not involved	1567	15.3
No response	146	1.4
b. How extensively would you like to be involved in research during your medical career (Indicate one of the above code numbers):(_)		
1) exclusively	60	0.6
2) significantly involved (several years set aside for full-time research or 25% or more of continuous career devoted to research pursuits)	1254	12.1
3) somwhat involved (one year or less set aside for research or less than 25% of continuous career)	3166	31.0
4) involved in a limited way (e.g. occasional cooperation with clinical trials of new drugs or medical devices in my practice)	3937	38.5
5) not involved	1046	10.2
No response	752	7.4

20. How much influence did each of the following factors have on your expectations of personal research involvement (Circle one number for each factor):

		Influence on Expectations for Research Involvement					
		No Resp.	Major 3	Moderate 2	Minor 1	None 0	Mean Rating
01) research experience while a pre-medical or medical student	All Schools	372	3103	2484	1570	2686	1.6
02) financial disadvantages of research career	All Schools	407	529	1549	2921	4809	0.8
03) challenge of search for new knowledge	All Schools	421	2136	3044	2383	2231	1.5
04) societal need for practitioners	All Schools	460	1725	2748	2521	2761	1.4
05) availability of research training support	All Schools	478	682	2072	3143	3840	1.0
06) obligation to "pay back" research training support by continued research activity	All Schools	447	259	760	2392	6357	0.5
07) uncertain availability of research funds after completion of training	All Schools	448	726	1430	2510	5101	0.8
08) increasing frustrations of researchers in conducting clinical research	All Schools	461	899	1797	2571	4487	0.9
09) opportunity to work in academic community	All Schools	480	1981	2631	2012	3111	1.4
10) other factors	All Schools	8889	456	69	98	703	1.2

21. Please indicate your first, second and third preferences for the different career activities listed below by writing their code numbers on the lines below:
first choice: (__) second choice: (__) third choice: (__)

CAREER ACTIVITY		CHOICES First No.	First %	Second No.	Second %	Third No.	Third %
Full-time academic faculty appointment:							
01) basic science teaching and research (e.g., anatomy, biochemistry)	All Schools	83	0.8	133	1.3	96	0.9
02) clinical science teaching and research, including patient care(e.g., internal medicine, surgery)	All Schools	2061	20.2	1186	11.6	1247	12.2
Salaried research scientist (e.g., in pharmaceutical industry, federal agency, state agency):							
03) basic medical sciences	All Schools	19	0.2	53	0.5	77	0.8
04) clinical sciences	All Schools	36	0.4	183	1.8	208	2.0
Private clinical practice (e.g., in a private office, paid by fee-for-service):							
05) alone	All Schools	404	4.0	365	3.6	1152	11.3
06) in partnership with one other physician	All Schools	1124	11.0	2472	24.2	927	9.1
07) in a group of three or more physicians	All Schools	4284	41.9	1932	18.9	1079	10.6
08) undecided among 5,6, and 7	All Schools	871	8.5	563	5.5	636	6.2
Salaried clinical practice, employed by:							
09) hospital	All Schools	637	6.2	1404	13.7	1517	14.9
10) prepaid group clinic	All Schools	334	3.3	1177	11.5	1419	13.9
11) state or federal agency (e.g., VA, Armed Forces, Public Health Service)	All Schools	221	2.2	307	3.0	607	5.9
12) Administration- no practice (e.g. hospital administrator, state or federal agency administrator, association or academic executive, business executive)	All Schools	17	0.2	40	0.4	206	2.0
No Response	All Schools	124	1.2	400	3.9	1044	10.2

22. Please indicate in which one of the regions listed below you presently plan to practice or be employed (Circle only one code number):

	ALL SCHOOLS Number	Percent
01) Northeast (Maine,N.H.,Vt.,Mass.,Conn.,R.I.,N.Y.,N.J.,Pa.,Del., Md.,D.C.)	2547	24.9
02) South (Va.,W.Va.,Ky.,Tenn.,N.C.,S.C.,Ga.,Ala.,Fla.,Miss.,Ark., La.,Okla.,Texas,Puerto Rico)	2388	23.4
03) Midwest (Ohio,Ind.,Ill.,Wisc.,Minn.,Mich.,Iowa,No.,Kansas,Neb., N.D.,S.D.)	1862	18.2
04) West (Colo.,N.Mex.,Utah,Ariz.,Nev.,Calif.,Wash.,Ore.,Idaho,Mont., Wyo.,Alaska,Hawaii,U.S. Territories and Canal Zone)	2166	21.2
05) Foreign	77	0.8
06) Undecided	1055	10.3
07) Not applicable (please explain)	75	0.7
No response	45	0.4

APPENDIX V.3

NINE FACTORS THAT AFFECT EXPECTATIONS OF RESEARCH CAREERS: MEANS AND STANDARD DEVIATIONS OF SCALE VALUES FOR THREE CAREER-CHOICE GROUPS

			I RESEARCH FIRSTS	II RESEARCH SECONDS	III NON RESEARCH	Test of Mean Group Differences F
		(N)	(2183)	(1209)	(6386)	(df = 2 & 9775)
(1)	Research experience while student	M	20.05	1.64	1.46	210.3
		SD	1.09	1.17	1.19	
(2)	Financial disadvantage of research career	M	.82	.83	.75	7.3
		SD	.84	.90	.92	
(3)	Challenge of search for knowledge	M	2.33	1.79	1.19	1226.6
		SD	.84	.98	.98	
(4)	Societal need for practitioners	M	.99	1.32	1.49	180.4
		SD	.91	1.02	1.10	
(5)	Availability of research training support	M	1.32	1.11	.81	267.9
		SD	.96	.92	.90	
(6)	"Payback" obligation	M	.51	.55	.46	10.5
		SD	.76	.80	.73	
(7)	Uncertainty of research funds	M	.97	.88	.69	81.2
		SD	.98	1.00	.93	
(8)	Frustration of researchers	M	.95	1.00	.88	9.6
		SD	.96	1.00	1.02	
(9)	Academic work opportunities	M	2.39	1.67	.94	1948.4
		SD	.82	1.02	.98	

VI. NATIONAL ESTIMATES OF FACULTY MANPOWER IN U.S. MEDICAL SCHOOLS "1975-76 THROUGH 1977-78"

This chapter of the report is an updating of a 1977 AAMC report entitled "National Estimates of Faculty Manpower in U.S. Medical Schools, An Approach and Some Preliminary Results." The chapter is a separately bound report due to a volume of over 300 tables. It was prepared as an aid to future projections of manpower estimates at U.S. medical schools.

The report provides statistics of the accession and attrition of medical school faculty on a departmental basis and is summarized by all departments. Summary tables of the balance of M.D.'s and Ph.D.'s in clinical departments for the three years covered in this update are provided in the following Exhibit VI.1. The fraction of M.D.'s in the clinical departments vis a vis Ph.D.'s has remained fairly constant. The departments of Pediatrics, Family Practice, Obstetrics-Gynecology, and Radiology show a gain in numbers over this period of time, but the M.D. and Ph.D. faculty balance remains approximately the same. In terms of rank, the gains in Ph.D. appointments are primarily at the Assistant Professor and Instructor level (Exhibit VI.1).

In a few departments, Anesthesiology, Medicine, Neurology, and Public Health, the increase in participation by Ph.D. faculty appears to be due to their replacing non-doctoral and other health related faculty rather than M.D. faculty.

Information from a previous study is used to compare the role of Ph.D.'s in clinical departments over a ten year period (Exhibits VI.3 and VI.4). This information shows an increase in the percentage of Ph.D.'s in all but two clinical departments. These figures also indicate that faculty holding Ph.D.'s as their primary degree increased from about 11.5 percent of the covered full-time clinical faculty in 1967 to 13.5 percent in 1977. While Ph.D.'s are increasing their role in clinical departments, the pace of this increase is slow.

The report also gives the number of vacant faculty positions on a departmental basis. These show that vacancies in clinical departments are only slightly more numerous than in basic science departments. Summary Exhibit VI.2 shows this balance for the years covered in the report.

Summary Exhibit VI.1

NUMBER AND PERCENT DISTRIBUTION OF M.D. AND Ph.D. FACULTY BY RANK AND CLINICAL DEPARTMENT FOR 1975-1978

Clinical Departments	M.D. - Professors			Ph.D. - Professors			M.D. - Associate Professors			Ph.D. - Associate Professors		
	1975-76 # %	1976-77 # %	1977-78 # %	1975-76 # %	1976-77 # %	1977-78 # %	1975-76 # %	1976-77 # %	1977-78 # %	1975-76 # %	1976-77 # %	1977-78 # %
Anesthesiology	242 88.6	239 88.9	264 88.1	5 1.8	5 1.9	6 2.0	222 86.4	233 86.4	240 85.7	20 7.8	19 7.0	19 6.8
Dermatology	79 82.3	72 80.0	79 77.5	6 6.3	6 6.7	9 8.8	44 62.0	42 60.9	40 61.5	20 28.2	20 29.0	20 30.8
Family Practice	104 82.5	117 83.6	167 83.9	16 12.7	17 12.1	23 11.6	134 74.9	153 77.7	248 79.7	29 16.2	29 14.7	41 13.2
Internal Medicine	1579 89.0	1734 89.4	1811 89.6	56 3.2	58 3.0	63 3.1	1418 80.5	1508 87.0	1567 87.1	101 6.2	113 6.5	122 6.8
Neurology	216 81.5	237 81.2	259 80.9	21 7.9	24 8.2	28 8.7	147 71.7	169 72.2	140 73.4	39 19.0	44 18.8	48 18.5
Obstetrics/Gynecology	299 84.2	320 84.2	348 84.5	29 8.2	30 7.9	30 7.3	285 79.6	276 78.0	276 77.8	48 13.4	51 14.4	52 14.7
Ophthalmology	109 71.2	124 70.9	124 71.3	22 14.4	27 15.4	25 14.4	100 67.1	108 67.9	97 64.7	37 24.8	39 24.5	41 27.3
Orthopedic Surgery	100 89.3	109 86.5	115 85.8	5 4.5	6 4.8	6 4.5	73 85.9	73 86.9	93 86.9	6 7.1	6 7.4	8 7.5
Otolaryngology	79 65.8	88 67.2	92 67.7	32 26.7	32 24.4	33 24.3	50 45.9	55 45.5	50 40.0	54 49.5	60 49.6	66 52.8
Pediatrics	637 87.9	674 87.8	733 87.5	45 6.2	47 6.1	51 6.1	589 86.1	652 86.4	711 86.3	58 8.5	63 8.3	68 8.3
Physical Medicine & Rehabilitation	79 71.2	81 70.4	96 73.9	22 19.8	24 20.9	22 16.9	56 60.2	66 58.9	74 62.7	20 21.5	27 24.1	25 21.2
Psychiatry	501 63.9	543 74.3	576 63.0	246 31.4	260 30.8	288 31.5	416 56.0	459 56.6	475 56.8	276 37.2	292 36.0	296 35.4
Public Health & Preventive Medicine	122 46.9	125 48.1	105 47.1	105 40.4	100 38.5	88 39.5	69 36.3	72 34.5	70 35.2	88 46.3	101 48.3	96 48.2
Radiology	388 78.2	435 78.2	463 77.0	71 14.3	79 14.2	86 14.3	366 75.0	390 74.4	456 74.8	85 17.4	92 17.6	105 17.2
Surgery	784 86.7	846 86.9	882 86.8	29 3.2	29 3.0	30 3.0	525 82.7	589 83.2	657 82.8	53 8.4	60 8.5	68 8.6
Urology	82 85.4	76 87.4	73 87.9	2 2.1	2 2.3	2 2.4	32 88.9	33 91.7	47 90.4	4 11.1	3 8.3	3 5.8
Other Clinical	141 72.7	86 76.1	121 77.1	53 27.3	27 23.9	36 22.9	105 71.0	92 78.0	94 70.7	29 19.6	26 22.0	26 19.6
TOTAL CLINICAL	5541 81.0	5906 81.4	6308 81.3	765 11.2	773 10.7	826 10.6	4631 76.6	4970 76.5	5385 76.7	967 16.0	1045 16.1	1104 15.7

Summary Exhibit VI.1 (continued)

NUMBER AND PERCENT DISTRIBUTION OF M.D. AND Ph.D. FACULTY BY RANK AND CLINICAL DEPARTMENT FOR 1975-1978

Clinical Departments	M.D. - Assistant Professors			Ph.D. - Assistant Professors			M.D. - Instructors			Ph.D. - Instructors		
	1975-76 # %	1976-77 # %	1977-78 # %	1975-76 # %	1976-77 # %	1977-78 # %	1975-76 # %	1976-77 # %	1977-78 # %	1975-76 # %	1976-77 # %	1977-78 # %
Anesthesiology	646 93.5	665 82.8	736 90.8	18 2.6	21 2.9	32 4.0	273 88.9	281 85.7	269 82.3	3 1.0	6 1.8	13 4.0
Dermatology	53 71.6	56 71.8	64 77.1	21 28.4	22 28.2	17 20.5	39 73.6	30 73.2	29 70.7	7 13.2	6 14.6	4 9.8
Family Practice	173 63.1	220 65.3	357 67.7	48 17.5	57 17.0	91 17.3	58 34.1	70 37.0	140 36.8	11 6.5	10 5.3	31 8.2
Internal Medicine	2245 85.7	2391 85.2	2540 85.3	209 8.0	240 8.6	263 8.8	941 76.9	1022 77.8	1046 76.2	126 10.3	124 9.4	146 10.6
Neurology	286 74.7	306 76.3	331 73.2	52 13.6	52 13.0	70 15.5	101 58.7	99 54.1	119 56.4	34 19.8	41 22.4	43 20.4
Obstetrics/Gynecology	372 78.0	394 78.5	497 78.4	72 15.1	75 15.0	94 14.8	164 61.4	148 64.1	179 65.1	34 12.7	25 10.8	29 10.6
Ophthalmology	131 69.3	155 72.4	183 72.1	38 20.1	40 18.7	50 19.7	49 51.0	46 46.5	45 41.7	15 15.6	20 20.2	29 26.9
Orthopedic Surgery	129 84.3	141 85.0	158 87.3	20 13.1	21 12.7	19 10.5	53 72.6	59 66.3	72 66.1	4 5.5	6 6.7	6 5.5
Otolaryngology	82 54.7	91 58.3	109 62.3	42 28.0	42 26.9	43 24.6	35 37.2	34 37.4	21 26.9	11 11.7	6 6.6	5 6.4
Pediatrics	957 80.4	1031 81.0	1151 80.6	139 11.7	153 12.0	171 12.0	334 57.7	354 60.9	380 60.9	53 9.2	54 9.3	62 9.9
Physical Medicine & Rehabilitation	105 54.3	111 57.2	127 57.5	38 19.9	34 17.5	41 18.6	37 27.2	57 32.6	46 30.3	12 9.5	15 8.6	20 13.2
Psychiatry	804 54.3	855 43.6	916 56.2	461 31.2	489 31.3	493 30.2	336 38.8	418 41.6	416 43.1	180 20.8	217 21.6	201 20.8
Public Health & Preventive Medicine	142 39.6	143 39.0	124 36.4	124 34.5	138 37.6	143 41.9	54 20.3	60 22.9	58 26.9	43 16.2	38 14.5	28 13.0
Radiology	669 74.4	763 75.2	844 74.4	152 16.9	168 16.6	195 17.2	305 61.5	278 61.5	321 63.7	42 8.5	37 8.2	54 10.7
Surgery	690 81.1	769 81.1	841 81.5	95 11.2	100 10.6	108 10.5	244 63.0	275 66.0	267 67.1	43 11.1	42 10.1	40 10.1
Urology	77 88.5	77 89.5	64 87.7	8 9.2	7 8.1	7 9.6	26 92.9	27 96.4	31 96.9	1 3.6	0 0.0	0 0.0
Other Clinical	140 52.8	100 59.2	146 55.7	78 29.4	46 27.2	63 24.1	29 14.5	33 26.9	63 30.7	14 7.0	16 13.1	15 7.3
TOTAL CLINICAL	7701 74.5	8268 75.2	9188 75.2	1615 15.6	1705 15.5	1900 15.6	3078 56.8	3291 58.7	3502 58.4	633 11.7	663 11.8	726 12.1

Summary Exhibit VI.1 (continued)

NUMBER AND PERCENT DISTRIBUTION OF M.D. AND Ph.D. FACULTY BY RANK AND CLINICAL DEPARTMENT FOR 1975-1976

Clinical Departments	Total M.D. 1975-76 #	%	1976-77 #	%	1977-78 #	%	Total Ph.D. 1975-76 #	%	1976-77 #	%	1977-78 #	%
Anesthesiology	1383	90.5	1418	89.5	1509	87.8	46	3.0	51	3.2	70	4.1
Dermatology	215	73.9	200	71.9	212	72.9	54	18.4	54	19.4	50	17.2
Family Practice	469	62.6	560	64.9	912	74.4	104	13.9	113	13.1	186	13.1
Internal Medicine	6183	85.4	6655	85.4	6964	85.2	492	6.8	535	6.9	594	7.3
Neurology	750	73.2	811	73.1	899	72.3	146	14.2	161	14.5	189	15.2
Obstetrics/Gynecology	1120	76.9	1138	77.6	1300	77.6	183	12.6	181	12.3	205	12.2
Ophthalmology	389	66.3	433	66.9	449	65.5	112	19.1	126	19.5	145	21.1
Orthopedic Surgery	355	83.9	382	82.2	438	82.5	35	8.3	39	8.4	39	7.3
Otolaryngology	246	52.0	268	53.7	272	52.9	134	29.4	140	28.1	147	28.6
Pediatrics	2517	79.2	2711	80.3	2975	80.1	295	9.3	317	9.4	352	9.5
Physical Medicine & Rehabilitation	277	52.2	315	52.9	343	55.2	92	17.3	100	16.8	108	17.4
Psychiatry	2057	53.1	2275	53.9	2383	54.8	1163	30.0	1258	29.8	1278	29.4
Public Health & Preventive Medicine	387	36.0	400	36.4	357	36.5	360	33.5	377	34.3	355	36.3
Radiology	1728	72.6	1866	73.3	2084	73.1	350	14.7	376	14.8	440	15.4
Surgery	2243	80.8	2479	81.4	2647	81.7	220	7.9	231	7.6	246	7.6
Urology	217	87.9	213	89.9	215	89.6	15	6.1	12	5.1	12	5.0
Other Clinical	415	51.4	311	59.5	424	56.0	174	21.6	115	22.0	140	18.5
TOTAL CLINICAL	20951	73.1	22435	73.9	24383	73.9	3980	13.9	4186	13.8	4556	13.8

Summary Exhibit VI.2

FULL-TIME FACULTY VACANCIES IN CLINICAL AND BASIC SCIENCE DEPARTMENTS, 1976-1978

	Full-Time Positions in Clinical Science Departments			Full-Time Positions in Basic Science Departments		
	Budgeted Positions	Vacant Positions	% Vacant	Budgeted Positions	Vacant Positions	% Vacant
197	30,473	1,825	5.99	11,413	669	5.86
1977	32,234	1,880	5.83	11,948	656	5.49
1978	35,008	2,010	5.74	12,364	695	5.62

Summary Exhibit VI.3

NUMBER AND PERCENT DISTRIBUTION OF FULL-TIME MEDICAL SCHOOL FACULTY
BY CLINICAL DEPARTMENT AND DEGREE 1967-68

CLINICAL DEPARTMENT	TYPE OF DEGREE												TOTAL FULL-TIME FACULTY	
	M.D. & Ph.D.		M.D.		Ph.D.		O.H.D.		Non-Doctoral		Unknown Degree			
	Number of Faculty	Percent of Degree	Number of Faculty	Percent of Degree	Number of Faculty	Percent of Degree	Number of Faculty	Percent of Degree	Number of Faculty	Percent of Degree	Number of Faculty	Percent of Degree	Number of Faculty	Percent of Total Full-Time Faculty
Anesthesiology	25	4.9	462	91.7	9	1.8	2	0.4	2	0.4	4	0.8	504	100.0
Dermatology	10	8.0	87	69.6	20	16.0	0	0.0	7	5.6	1	0.8	125	100.0
Family Practice	4	5.6	31	43.7	12	16.9	5	7.0	19	26.8	0	0.0	71	100.0
Internal Medicine	189	6.2	2647	86.7	123	4.1	4	0.1	76	2.5	13	0.4	3052	100.0
Neurology	34	8.0	330	77.6	48	11.3	0	0.0	11	2.6	2	0.5	425	100.0
Obstetrics/Gynecology	31	5.3	472	81.5	63	10.9	0	0.0	12	2.1	1	0.2	579	100.0
Ophthalmology	22	8.4	165	63.0	57	21.8	3	1.1	11	4.2	4	1.5	262	100.0
Orthopedic Surgery	11	7.8	118	83.7	7	5.0	0	0.0	4	2.8	1	0.7	141	100.0
Otolaryngology	5	2.7	91	49.5	48	26.1	3	1.6	37	20.1	0	0.0	184	100.0
Pediatrics	56	3.7	1236	82.4	128	8.5	3	0.2	75	5.0	3	0.2	1501	100.0
Physical Medicine & Rehabilitation	10	3.7	142	51.8	40	14.6	0	0.0	74	27.0	8	2.9	274	100.0
Psychiatry	44	2.6	981	58.3	451	26.8	1	0.1	199	11.8	6	0.4	1682	100.0
Public Health & Preventive Medicine	24	4.6	207	39.3	147	27.9	6	1.1	138	26.2	5	0.9	527	100.0
Radiology	32	3.7	639	72.7	103	11.7	2	0.2	86	9.8	17	1.9	879	100.0
Surgery	117	8.2	1176	82.8	80	5.6	12	0.9	27	1.9	8	0.6	1420	100.0
Other Clinical	0	0.0	1	50.0	0	0.0	0	0.0	1	50.0	0	0.0	2	100.0
TOTAL CLINICAL	614	5.3	8785	75.5	1336	11.5	41	0.4	779	6.7	73	0.6	11628	100.0

Excerpted from Comparison of Characteristics of U.S. Medical School Salaried Faculty in the Past Decade, 1968-1978, AAMC, Oct. 1979.

Summary Exhibit VI.4

NUMBER AND PERCENT DISTRIBUTION OF FULL-TIME MEDICAL SCHOOL FACULTY BY CLINICAL DEPARTMENT AND DEGREE 1977-78

CLINICAL DEPARTMENT	TYPE OF DEGREE												TOTAL FULL-TIME FACULTY	
	M.D. & Ph.D.		M.D.		Ph.D.		O.H.D.		Non-Doctoral		Unknown Degree			
	Number of Faculty	Percent of Degree	Number of Faculty	Percent of Degree	Number of Faculty	Percent of Degree	Number of Faculty	Percent of Degree	Number of Faculty	Percent of Degree	Number of Faculty	Percent of Degree	Number of Faculty	Percent of Total Full-Time Faculty
Anesthesiology	70	4.6	1340	88.9	58	3.8	6	0.4	22	1.5	12	0.8	1508	100.0
Dermatology	14	6.1	164	71.6	39	17.1	1	0.4	3	1.3	8	3.5	229	100.0
Family Practice	13	1.6	529	66.5	104	13.1	11	1.4	127	16.0	11	1.4	795	100.0
Internal Medicine	360	4.7	6544	85.4	536	7.0	11	0.1	155	2.0	61	0.8	7667	100.0
Neurology	62	6.4	713	73.3	141	14.5	1	0.1	35	3.6	20	2.1	972	100.0
Obstetrics/Gynecology	68	5.0	1061	78.1	162	11.9	4	0.3	49	3.6	14	1.1	1358	100.0
Ophthalmology	37	6.6	370	65.5	120	21.2	5	0.9	22	3.9	11	1.9	565	100.0
Orthopedic Surgery	18	4.4	350	84.7	30	7.3	1	0.2	11	2.7	3	0.7	413	100.0
Otolaryngology	10	2.5	211	53.3	109	27.5	4	1.0	59	14.9	3	0.8	396	100.0
Pediatrics	113	3.3	2787	80.4	327	9.4	20	0.6	183	5.3	34	1.0	3464	100.0
Physical Medicine & Rehabilitation	12	2.4	257	51.0	86	17.0	3	0.6	136	27.0	10	2.0	504	100.0
Psychiatry	98	2.5	2164	55.5	1150	29.5	2	*	439	11.3	46	1.2	3899	100.0
Public Health & Preventive Medicine	29	2.8	373	36.7	371	36.5	19	1.9	202	19.9	22	2.2	1016	100.0
Radiology	93	3.7	1833	72.8	386	15.3	10	0.4	146	5.8	50	2.0	2518	100.0
Surgery	189	5.7	2703	82.2	229	7.0	46	1.4	74	2.2	49	1.5	3290	100.0
Other Clinical	1	1.8	34	59.6	11	19.3	0	0.0	11	19.3	0	0.0	57	100.0
TOTAL CLINICAL	1187	4.1	21433	74.8	3859	13.5	144	0.5	1674	5.9	354	1.2	28651	100.0

Excerpted from Comparison of Characteristics of U.S. Medical School Salaried Faculty in the Past Decade, 1968-1978, AAMC, Oct. 1979.

VII. PROJECTIONS OF REPLACEMENT NEEDS FOR MEDICAL SCHOOL FACULTY, 1980-1990

A. Introduction

This section of the report presents projections of the future replacement need for the full-time faculty of U.S. medical schools. Separate projections are made for the number needed to replace faculty who leave and the number needed to maintain different growth rates in the total faculty. Projections are presented for the years 1980 through 1990.

Projections of replacement need are made by applying age-specific loss rates to the present and projected future age distributions of the medical school faculty. Future age distributions are in part a function of the future growth in the size of the faculty. This is because higher growth rates result in the addition of larger numbers of young faculty. Since the future growth in faculty is unknown, three different rates of growth are used to produce three sets of projections. The three annual growth rates used, zero percent, three percent, and six percent, represent the range in expected rates of future growth.

B. The Data

Data used in the study are derived from two sources. The primary source is the Faculty Roster System of the AAMC. The Faculty Roster is a computerized data base containing information on more than 90,000 past and present faculty members of American medical schools.

Data from the Faculty Roster are used to determine the age-specific loss rates of full-time faculty, the base age distribution of the full-time faculty on January 1, 1980, and the age distribution of newly hired faculty.

This study used "Roll-Back" files generated from the current Faculty Roster Master File. The Faculty Roster relies on reports from the medical schools for its information. When these reports are received, they are incorporated into the master file. However, because of delays in reporting information, particularly on new faculty, the current master file fails to provide the most accurate profile of the faculty at a point in time. A more accurate profile of the faculty is achieved when the current master file is used to generate a Roll-Back file for a previous point in time. These files are generated by the Faculty Roster System Roll-Back Program. The Roll-Back Program examines the effective dates of reported changes and generates the most accurate data file of faculty active at a previous time. Essentially, the Roll-Back Program reconstructs the active portion of the master file as it would have appeared if there had been no delay in reports and all information had been immediately incorporated into the data base. Roll-Back files for January 1 of the years 1974 through 1979 were used in this study.

An additional data file derived from the Faculty Roster contains more than 33,000 faculty members reported to the roster since 1967 who no longer hold appointments at American medical schools. These former faculty members comprise the inactive portion of the Faculty Roster master file.

The second source of data is a tally of full-time faculty reported on the Liaison Committee on Medical Education (LCME) Annual Medical School Questionnaire. This questionnaire is administered by the LCME of the AAMC and the AMA to all American medical schools. A tabulation of all full-time faculty employed by the medical schools on January 1, 1980 was made from the most recent edition of the questionnaire. This tally, and an estimate of faculty at one school that failed to respond to the questionnaire, is the

base full-time faculty used in the projections.

C. Method

The model used to project future faculty needs and age distributions is based on four factors. These factors are: 1. age-specific loss rates of full-time faculty; 2. the size and age distribution of the initial, or base, faculty; 3. the age distribution of new faculty; and 4. the future growth of the faculty.

Age-specific loss rates were generated from the Faculty Roster. The age of persons reported to have left the full-time faculty during the years 1977, 1978, and 1979 were compared with the number of full-time faculty of each age on January 1 of each of these years. These data were used to calculate age-specific rates of faculty loss and are presented in Exhibit VII-1. They indicate relatively high rates of loss for both the youngest and oldest faculty.

January 1, 1980 served as the base for the projections made in this study. Data reported on the annual LCME questionnaire indicated a total of 49,605 full-time medical school faculty on this date. However, the age distribution of these faculty is not reported. The proportional distribution of this number among different ages was estimated from the Faculty Roster.

The age distributions of full-time faculty in the Roll-Back files for January 1 of 1977, 1978, and 1979 were calculated. An average of these distributions was seen as the most accurate estimate of the recent age composition of full-time faculty. Since little recent change in the age composition of the faculty is believed to have occurred, this average

distribution was also used as the best estimate of the faculty age distribution on January 1, 1980. When the proportions of the distribution are applied to the number of total faculty, 49,605, an estimated age distribution of the faculty on January 1, 1980 is produced. This distribution is presented in Exhibit VII.2. It is used as the base for all subsequent projections.

The age distribution of new faculty was estimated in a similar fashion. Full-time faculty receiving their first medical school appointments during the years 1974 through 1978 were identified, and their ages on January 1 of the year of their first appointment were calculated. Their age distribution is used as the age distribution of new faculty in the projections. This distribution is presented in Exhibit VII.3.

The final element needed for the projections is the future rate of growth in the size of the full-time faculty. During the past five years, this growth has averaged about six percent per year. However, many people expect that this rate of growth will decline and possibly even become zero. Separate projections, therefore, were made for three different rates of annual growth. These rates are zero percent, three percent, and six percent.

The above factors were combined to project the future needs for new faculty and future age distributions in the following manner. The age-specific loss rates were applied to the initial age distribution and used to estimate the number of faculty of each age who leave the faculty during 1980. The estimated numbers of lost faculty are subtracted from the initial number of faculty for each age. This results in the number of continuing faculty for each age. The sum of the estimates of faculty loss is an estimate of the total number who leave the faculty during the year.

Exhibit VII.1

AGE-SPECIFIC LOSS RATES OF FULL-TIME FACULTY

Age of Faculty on January 1	Percent of Faculty Leaving During Calendar Year
23	20.0
24	29.7
25	21.7
26	21.1
27	18.1
28	16.4
29	15.1
30	13.4
31	10.8
32	10.3
33	9.1
34	7.7
35	6.8
36	6.7
37	5.9
38	5.5
39	5.3
40	4.8
41	4.9
42	3.8
43	3.6
44	4.0
45	4.0
46	3.2
47	3.0
48	2.8
49	3.5
50	2.9
51	3.2
52	3.1
53	2.9
54	3.7
55	2.4
56	3.3
57	3.4
58	3.7
59	3.2
60	2.4
61	4.4
62	5.3
63	3.9
64	11.7
65	10.8
66	12.3
67	13.5
68	12.9
69	19.8
70 and above	11.0

Exhibit VII.2

ESTIMATED AGE DISTRIBUTION OF THE FULL-TIME FACULTY ON JANUARY 1, 1980

Age	Number	Percent
23	20	0.04
24	35	0.07
25	79	0.16
26	139	0.28
27	223	0.45
28	392	0.79
29	734	1.48
30	1151	2.32
31	1493	3.01
32	1721	3.47
33	2069	4.17
34	2356	4.75
35	2416	4.87
36	2302	4.64
37	2118	4.27
38	2059	4.15
39	1959	3.95
40	1905	3.84
41	1791	3.61
42	1696	3.42
43	1592	3.21
44	1533	3.09
45	1498	3.02
46	1493	3.01
47	1463	2.95
48	1399	2.82
49	1315	2.65
50	1245	2.51
51	1186	2.39
52	1126	2.27
53	1066	2.15
54	1032	2.08
55	962	1.94
56	878	1.77
57	754	1.52
58	630	1.27
59	561	1.13
60	516	1.04
61	476	0.96
62	436	0.88
63	387	0.78
64	337	0.68
65	253	0.51
66	198	0.40
67	159	0.32
68	124	0.25
69	99	0.20
70 and above	229	0.46
TOTAL	49605	100.0

Exhibit VII.3

AGE DISTRIBUTION OF NEWLY HIRED FULL-TIME FACULTY

Age of Faculty on January 1 of Year Hired	Percent of Newly Hired Faculty
22	0.15
23	0.27
24	0.67
25	1.08
26	1.70
27	2.51
28	4.71
29	8.02
30	10.55
31	11.67
32	11.72
33	10.28
34	7.81
35	5.44
36	3.92
37	2.77
38	2.05
39	1.80
40	1.47
41	1.15
42	1.06
43	1.04
44	0.94
45	0.92
46	0.80
47	0.72
48	0.66
49	0.42
50	0.49
51	0.47
52	0.41
53	0.36
54	0.28
55	0.30
56	0.21
57	0.22
58	0.16
59	0.14
60	0.16
61	0.17
62	0.11
63	0.08
64	0.14
TOTAL	100.00

Replacement need in this study is defined as equal to this sum.

Replacement need is an important element in the determination of the total number of new faculty who will be hired in a year. If the faculty is to remain the same size, new faculty must equal the replacement need. If the faculty is to grow, the number of new faculty must equal the replacement need plus the net increase in the size of the faculty. When the total number of new faculty is determined, they are distributed among the different ages according to the new faculty age distribution. The number for each age is then added to the number of continuing faculty of that age. This procedure results in a new age distribution which combines the effects of both faculty loss and accessions during a year. However, at the end of a year, the faculty are one year older than they were at the beginning. This is expressed in the distribution by moving the counts for each age to the next higher age.

The completion of this process results in a projected age distribution for January 1 of the next year. This age distribution is then used to project the following year. In this study, ten such projections are made for each of the assumed growth rates.

D. Findings

An initial focus of this study, as specified in the contract, was the estimation of age-specific death and retirement rates. The loss of faculty for these reasons is especially important because the loss is usually irreversible. The reasons reported to the Faculty Roster for the loss of full-time faculty during 1977, 1978, and 1979 were examined. This analysis showed that less than 10% of the loss during each of these years was for the

reported reasons of death or retirement. The vast majority of the faculty loss was for other reasons. Age-specific rates of retirement and death, derived from this analysis, are presented in Exhibit VII.4. This analysis also showed that about 60% of the faculty lost during these three years were less than 40 years old.

The techniques described in the previous section were used to produce a series of projections of future faculty need and age composition. Faculty need was divided into two components, the need for new faculty to replace those who leave faculty positions and the need for additional faculty to maintain any growth. Replacement need results from the loss of faculty for all reasons, rather than just death and retirement. The loss rates presented in Exhibit VII.1 were therefore used to estimate this need. Separate projections were made assuming future annual growth rates in the size of the faculty of zero percent, three percent, and six percent.

Exhibit VII.5 presents these projections of need for the years 1980 through 1990. The first three rows, under the calendar years, present projections of need assuming the size of the medical school faculty remains at the January 1980 size of 49,605. When the age-specific loss rates in Exhibit VII.1 are applied to the faculty age distributions in January 1980, 2,940 full-time faculty members are estimated to leave the medical school faculties. An equal number of new faculty is therefore needed to replace the faculty who leave. Under conditions of zero growth, no additional new faculty are needed since the replacement of 2,940 faculty will maintain the size of the faculty at 49,605. However, if a three percent growth in the faculty is to occur, an additional number, equal to three percent of the initial faculty, or 1,488, must also be hired. This results in a total

need of 4,428 new full-time faculty. These figures are given in the second three rows in Exhibit VII.5. In the same manner, six percent growth in the total faculty will be achieved in 1980 if 2,976 new faculty, in addition to the 2,940 needed for replacement or a total of 5,918, are hired.

Following 1980, the estimates of replacement need are different for the various growth rates. This is due to two factors. The first factor is the increase in the total size of the faculty under three percent and six percent growth rates. Given a similar proportion of faculty who leave, the larger size of the total faculty results in a larger number leaving. The second factor is the difference in the proportional age distributions of the faculty. Over time, the proportion of faculty in different age groups changes. When the age-specific loss rates are applied to these new distributions, the changes in the age distributions may result in a change in the estimated number of lost faculty, even when the total size of faculty remains constant. This is because the age-specific loss rates differ with age. The effect of this second factor is evident in the initial decline in the replacement need that is projected to occur under zero growth. In this series of projections, the smaller number of new faculty being added each year results in an older composition of the faculty. The increase in the proportion of faculty between the ages of 40 and 60, and the low loss rates which apply to faculty in these ages, result in the decline in projected replacement need.

Overall, the projections show a wide range of possible future needs for new full-time faculty. While the projected total need, under conditions of zero growth, declines slowly from 2,940 new faculty in 1980 to a low of 2,587 in 1987 and remains roughly constant, it increases substantially under conditions of six percent growth. The third series of projections shows total

need increasing from 5,916 new faculty in 1980 to 10,605 in the year 1990, if the faculty grows at a rate of six percent.

The projection of the future need for new faculty also produced projections of future age distributions of the full-time faculty. Separate projections were made for each of the three growth rates. Exhibit VII.6 presents the projected future age distributions under conditions of no growth. Each column shows the projected number of full-time faculty of each age on January 1 of a year. The number for each age is rounded to the nearest person but based on unrounded calculations that involved fractional persons. The totals at the bottom of the columns are totals of the rounded counts. The results of the unrounded calculations, used to produce Exhibit VII.6, total to exactly 49,605 for every column.

The projected age distributions under conditions of three percent and six percent growth are presented in Exhibits VII.7 and VII.8, respectively. These distributions incorporate the additional new faculty required for the growth specified. As in the previous exhibit, the counts given for each age are rounded, and the totals given at the bottom are totals of the rounded counts presented.

Exhibits VII.9 through VII.11 present some of the characteristics of the three sets of age projections in a more concise form. These exhibits show the proportions of faculty in broad age categories for each year of the projections. These proportions have their most dramatic shift under conditions of zero growth. This shift, showing a dramatic aging of the full-time faculty, is presented in Exhibit VII.9. It shows a substantial decline in the proportions, and number, of faculty under the age of 40. Faculty aged 22 through 29 drop from 3.3 percent of the total to 1.1 percent, while

Exhibit VII.4

RATE OF YEARLY LOSS OF FACULTY DUE TO RETIREMENT, DEATH, AND ALL OTHER REASONS

Age of Faculty	Percent Retiring During A Year	Percent Dying During A Year	Percent Leaving For Other Reasons
25 - 29	--	--	16.66
30 - 34	--	--	9.76
35 - 39	--	0.06	6.03
40 - 44	--	0.11	4.12
45 - 49	--	0.18	3.11
50 - 54	0.15	0.22	2.80
55 - 59	0.56	0.29	2.31
60 - 64	2.63	0.49	2.03
65 - 69	9.63	1.04	2.36
70 and Above	5.83	1.89	3.26

Exhibit VII.5

PROJECTED ANNUAL NEED FOR NEW FULL-TIME FACULTY FOR THE YEARS 1980 THROUGH 1990, ASSUMING 0 PERCENT, 3 PERCENT, AND 6 PERCENT GROWTH RATES

Calendar Year	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990
Zero Percent Growth											
Number Needed for Replacement	2940	2825	2741	2681	2637	2610	2594	2587	2590	2601	2617
Number Needed for Growth	0	0	0	0	0	0	0	0	0	0	0
Total Need	2940	2825	2741	2681	2637	2610	2594	2587	2590	2601	2617
Three Percent Growth											
Number Needed for Replacement	2940	2961	3003	3060	3130	3213	3304	3405	3514	3632	3755
Number Needed for Growth	1488	1533	1579	1626	1675	1725	1777	1830	1885	1942	2000
Total Need	4428	4494	4582	4686	4805	4938	5081	5235	5399	5574	5755
Six Percent Growth											
Number Needed for Replacement	2940	3097	3272	3464	3671	3896	4136	4394	4669	4964	5275
Number Needed for Growth	2976	3155	3344	3545	3758	3983	4222	4475	4744	5028	5330
Total Need	5916	6252	6616	7009	7429	7879	8358	8869	9413	9992	10605

Exhibit VII.6

PROJECTED NUMBER OF FULL-TIME FACULTY BY AGE FOR THE YEARS 1980 THROUGH 1990, ASSUMING NO GROWTH IN TOTAL FACULTY

Age	Number of faculty on January 1 of year										
	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990
23	20	4	4	4	4	4	4	4	4	4	4
24	35	24	11	11	10	10	10	10	10	10	10
25	79	44	36	26	26	25	25	24	24	24	24
26	139	94	65	58	49	49	48	48	47	47	47
27	223	160	122	98	91	84	83	82	82	81	81
28	392	256	202	169	148	141	134	133	132	132	132
29	734	466	347	298	267	248	241	234	233	232	233
30	1,151	859	622	514	468	438	420	412	406	406	406
31	1,493	1,307	1,042	828	728	684	655	637	630	625	626
32	1,721	1,675	1,496	1,249	1,051	957	915	887	870	864	862
33	2,069	1,888	1,834	1,663	1,434	1,252	1,164	1,124	1,099	1,084	1,080
34	2,356	2,183	2,007	1,949	1,787	1,575	1,406	1,324	1,288	1,265	1,253
35	2,416	2,404	2,236	2,067	2,008	1,856	1,657	1,500	1,424	1,391	1,371
36	2,302	2,412	2,394	2,233	2,072	2,015	1,872	1,685	1,539	1,468	1,438
37	2,118	2,263	2,361	2,341	2,188	2,037	1,982	1,848	1,674	1,537	1,472
38	2,059	2,074	2,208	2,298	2,277	2,132	1,989	1,937	1,811	1,647	1,518
39	1,959	2,006	2,018	2,143	2,227	2,206	2,068	1,933	1,883	1,765	1,610
40	1,905	1,908	1,951	1,960	2,078	2,156	2,136	2,005	1,877	1,830	1,718
41	1,791	1,857	1,858	1,898	1,905	2,017	2,091	2,072	1,947	1,825	1,780
42	1,696	1,737	1,799	1,798	1,836	1,842	1,948	2,018	2,000	1,881	1,766
43	1,592	1,663	1,701	1,760	1,758	1,794	1,800	1,901	1,969	1,951	1,837
44	1,533	1,565	1,633	1,668	1,725	1,722	1,757	1,762	1,859	1,925	1,908
45	1,498	1,499	1,529	1,593	1,626	1,681	1,678	1,711	1,716	1,809	1,872
46	1,493	1,465	1,465	1,493	1,554	1,585	1,638	1,635	1,666	1,671	1,761
47	1,463	1,469	1,441	1,440	1,467	1,525	1,555	1,606	1,603	1,633	1,638
48	1,399	1,440	1,445	1,418	1,416	1,442	1,498	1,527	1,576	1,574	1,603
49	1,315	1,379	1,418	1,423	1,396	1,394	1,419	1,473	1,501	1,549	1,547
50	1,245	1,281	1,343	1,380	1,384	1,358	1,356	1,380	1,432	1,459	1,506
51	1,186	1,223	1,258	1,317	1,353	1,357	1,331	1,329	1,353	1,403	1,429
52	1,126	1,162	1,197	1,231	1,287	1,322	1,326	1,301	1,299	1,322	1,370
53	1,066	1,103	1,138	1,171	1,204	1,258	1,292	1,296	1,271	1,269	1,292
54	1,032	1,046	1,081	1,115	1,147	1,179	1,231	1,264	1,268	1,243	1,242
55	962	1,002	1,015	1,049	1,081	1,112	1,143	1,193	1,224	1,228	1,204
56	878	948	986	999	1,032	1,063	1,093	1,123	1,172	1,202	1,206
57	754	855	923	959	972	1,003	1,033	1,062	1,091	1,139	1,168
58	630	735	832	898	932	945	975	1,004	1,032	1,060	1,106
59	561	611	712	806	869	902	914	943	971	998	1,025
60	516	547	595	693	784	845	877	888	916	944	970
61	476	508	538	585	681	769	829	860	871	898	926
62	436	460	490	519	564	656	740	797	827	837	863
63	387	416	439	467	494	537	624	704	758	786	796
64	337	374	402	424	451	477	518	602	679	731	757
65	253	302	334	359	378	402	425	461	535	603	649
66	198	226	269	298	320	337	359	379	411	477	538
67	159	174	198	236	261	281	296	315	332	360	418
68	124	138	151	171	204	226	243	256	272	287	311
69	99	108	120	132	149	178	197	212	223	237	250
70	229	283	338	397	459	528	613	704	797	888	980
TOTAL	49,605	49,603	49,604	49,606	49,602	49,606	49,608	49,605	49,604	49,601	49,603

Exhibit VII.7

PROJECTED NUMBER OF FULL-TIME FACULTY BY AGE FOR THE YEARS 1980 THROUGH 1990, ASSUMING A 3 PERCENT ANNUAL GROWTH IN TOTAL FACULTY

Age	Number of faculty on January 1 of year										
	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990
23	20	7	7	7	7	7	7	8	8	8	8
24	35	28	18	18	18	19	19	19	21	21	21
25	79	54	50	43	44	45	46	47	48	51	52
26	139	110	91	89	84	86	89	91	93	96	100
27	223	185	163	150	150	148	152	157	161	165	170
28	392	294	264	249	240	244	245	252	260	267	275
29	734	536	457	437	429	427	437	444	457	472	486
30	1,151	978	815	755	747	750	758	779	797	821	847
31	1,493	1,464	1,321	1,189	1,148	1,154	1,170	1,192	1,227	1,260	1,299
32	1,721	1,849	1,830	1,713	1,607	1,585	1,606	1,637	1,674	1,725	1,774
33	2,069	2,063	2,185	2,179	2,086	2,005	2,000	2,036	2,082	2,134	2,200
34	2,356	2,336	2,337	2,457	2,462	2,390	2,330	2,340	2,389	2,448	2,512
35	2,416	2,520	2,507	2,515	2,634	2,648	2,592	2,547	2,569	2,627	2,695
36	2,302	2,493	2,593	2,586	2,599	2,716	2,737	2,692	2,659	2,688	2,751
37	2,118	2,321	2,502	2,599	2,596	2,613	2,728	2,753	2,717	2,692	2,726
38	2,059	2,116	2,308	2,481	2,575	2,576	2,596	2,708	2,736	2,706	2,687
39	1,959	2,037	2,092	2,275	2,441	2,532	2,536	2,557	2,666	2,696	2,671
40	1,905	1,935	2,010	2,064	2,239	2,398	2,487	2,493	2,516	2,622	2,653
41	1,791	1,879	1,908	1,981	2,034	2,202	2,355	2,442	2,450	2,475	2,578
42	1,696	1,754	1,839	1,867	1,938	1,990	2,151	2,298	2,383	2,392	2,418
43	1,592	1,678	1,735	1,818	1,846	1,915	1,967	2,123	2,266	2,350	2,360
44	1,533	1,581	1,664	1,720	1,801	1,830	1,897	1,949	2,101	2,241	2,323
45	1,498	1,513	1,560	1,641	1,695	1,774	1,803	1,869	1,920	2,068	2,204
46	1,493	1,479	1,494	1,540	1,618	1,671	1,748	1,778	1,842	1,893	2,037
47	1,463	1,481	1,468	1,483	1,528	1,605	1,657	1,733	1,763	1,826	1,877
48	1,399	1,451	1,469	1,457	1,472	1,517	1,592	1,644	1,719	1,749	1,811
49	1,315	1,389	1,440	1,458	1,447	1,463	1,507	1,581	1,633	1,707	1,737
50	1,245	1,288	1,359	1,409	1,427	1,417	1,433	1,476	1,548	1,599	1,671
51	1,186	1,231	1,273	1,342	1,391	1,409	1,400	1,416	1,459	1,530	1,580
52	1,126	1,169	1,213	1,254	1,321	1,369	1,387	1,379	1,395	1,438	1,507
53	1,066	1,109	1,151	1,194	1,234	1,300	1,347	1,365	1,358	1,374	1,416
54	1,032	1,051	1,093	1,134	1,176	1,216	1,280	1,326	1,344	1,338	1,354
55	962	1,006	1,025	1,065	1,105	1,146	1,185	1,247	1,292	1,309	1,304
56	878	952	995	1,014	1,053	1,093	1,133	1,172	1,233	1,277	1,294
57	754	858	930	972	990	1,028	1,067	1,106	1,144	1,204	1,247
58	630	738	839	908	949	967	1,004	1,042	1,080	1,117	1,175
59	561	614	718	815	882	922	939	975	1,012	1,049	1,085
60	516	549	601	701	795	861	899	916	951	987	1,023
61	476	511	543	594	692	784	848	886	902	937	972
62	436	463	496	527	576	670	758	819	856	871	905
63	387	418	443	475	504	551	640	723	781	817	831
64	337	375	405	429	460	488	533	619	699	755	790
65	253	304	337	364	385	413	438	478	554	625	674
66	198	226	271	301	325	343	368	391	426	494	558
67	159	174	198	238	264	285	301	323	343	374	433
68	124	138	151	171	206	228	247	260	279	297	324
69	99	108	120	132	149	179	199	215	226	243	259
70+	229	283	338	397	459	528	613	705	799	892	989
	49,605	51,096	52,626	54,207	55,828	57,507	59,231	61,008	62,838	64,727	66,663

Exhibit VII.8

PROJECTED NUMBER OF FULL-TIME FACULTY BY AGE FOR THE YEARS 1980 THROUGH 1990, ASSUMING A 6 PERCENT ANNUAL GROWTH IN TOTAL FACULTY

Age	Number of faculty on January 1 of year										
	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990
23	20	9	9	10	11	11	12	13	13	14	15
24	35	32	24	25	27	29	30	32	34	36	38
25	79	64	64	61	65	69	73	77	82	87	92
26	139	126	118	122	123	131	139	147	156	166	176
27	223	210	206	206	215	223	237	252	267	283	301
28	392	331	329	335	345	363	380	404	429	455	483
29	734	606	571	587	610	638	675	712	755	802	851
30	1,151	1,098	1,016	1,015	1,060	1,114	1,174	1,244	1,316	1,396	1,482
31	1,493	1,621	1,610	1,578	1,618	1,702	1,796	1,899	2,013	2,133	2,263
32	1,721	2,022	2,175	2,208	2,225	2,310	2,438	2,578	2,729	2,894	3,069
33	2,069	2,237	2,546	2,726	2,802	2,867	2,996	3,167	3,352	3,551	3,767
34	2,356	2,489	2,676	2,994	3,198	3,311	3,416	3,583	3,790	4,015	4,255
35	2,416	2,637	2,786	2,987	3,311	3,532	3,671	3,806	4,000	4,233	4,486
36	2,302	2,574	2,798	2,956	3,165	3,490	3,720	3,876	4,030	4,240	4,489
37	2,118	2,380	2,647	2,870	3,033	3,244	3,565	3,799	3,964	4,129	4,348
38	2,059	2,157	2,413	2,674	2,895	3,060	3,271	3,586	3,820	3,991	4,162
39	1,959	2,067	2,167	2,416	2,671	2,888	3,053	3,263	3,571	3,803	3,976
40	1,905	1,962	2,070	2,171	2,414	2,663	2,877	3,042	3,250	3,551	3,781
41	1,791	1,901	1,960	2,068	2,170	2,407	2,651	2,862	3,026	3,232	3,527
42	1,696	1,771	1,880	1,940	2,047	2,149	2,380	2,617	2,824	2,986	3,189
43	1,592	1,694	1,770	1,879	1,941	2,048	2,151	2,378	2,612	2,816	2,978
44	1,533	1,596	1,698	1,775	1,884	1,948	2,056	2,161	2,385	2,616	2,819
45	1,498	1,527	1,591	1,692	1,770	1,878	1,944	2,052	2,158	2,378	2,605
46	1,493	1,493	1,523	1,588	1,689	1,768	1,875	1,943	2,051	2,158	2,375
47	1,463	1,493	1,495	1,527	1,593	1,694	1,774	1,882	1,952	2,061	2,169
48	1,399	1,462	1,493	1,498	1,532	1,599	1,700	1,781	1,889	1,961	2,071
49	1,315	1,399	1,462	1,495	1,502	1,538	1,606	1,708	1,790	1,898	1,972
50	1,245	1,294	1,376	1,439	1,472	1,481	1,517	1,585	1,685	1,767	1,874
51	1,186	1,238	1,287	1,369	1,432	1,466	1,477	1,514	1,582	1,682	1,765
52	1,126	1,176	1,228	1,277	1,358	1,421	1,456	1,469	1,507	1,576	1,675
53	1,066	1,115	1,165	1,217	1,266	1,346	1,409	1,445	1,460	1,499	1,568
54	1,032	1,056	1,105	1,155	1,207	1,256	1,335	1,398	1,435	1,452	1,491
55	962	1,010	1,034	1,083	1,132	1,183	1,232	1,309	1,371	1,408	1,426
56	878	957	1,005	1,029	1,078	1,127	1,178	1,228	1,304	1,366	1,404
57	754	861	939	986	1,010	1,058	1,106	1,157	1,206	1,281	1,342
58	630	741	845	922	968	992	1,039	1,087	1,137	1,186	1,259
59	561	616	724	824	899	944	968	1,014	1,061	1,110	1,158
60	516	551	605	710	807	881	925	949	994	1,040	1,088
61	476	513	548	601	704	800	872	916	940	985	1,031
62	436	465	501	535	586	686	778	848	891	915	959
63	387	419	447	482	514	563	658	746	813	854	877
64	337	377	408	435	469	500	547	639	724	789	829
65	253	306	342	370	394	425	453	495	577	652	711
66	198	226	273	305	330	351	379	404	442	515	582
67	159	174	198	239	267	289	308	332	354	388	452
68	124	138	151	171	207	231	250	266	287	306	336
69	99	108	120	132	149	180	201	218	232	250	267
70+	229	283	338	397	459	528	614	707	804	902	1003
TOT	49,605	52,528	55,736	59,081	62,624	66,382	70,362	74,590	79,064	83,808	88,836

Exhibit VII.9

PROJECTED AGE DISTRIBUTION OF FULL-TIME FACULTY FOR THE YEARS 1980 THROUGH 1990
ASSUMING NO GROWTH IN TOTAL FACULTY
(Derived From Exhibit VII.6)

Ages of Faculty	Percent of Faculty in Age Group on January 1 of Year										
	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990
22-29	3.3	2.1	1.6	1.3	1.2	1.1	1.1	1.1	1.1	1.1	1.1
30-39	39.6	38.4	36.7	34.8	32.7	30.5	28.5	26.8	25.4	24.3	23.5
40-49	31.6	32.2	32.7	33.2	33.8	34.6	35.3	35.7	35.7	35.6	35.1
50-59	19.0	20.1	21.1	22.0	22.7	23.2	23.6	24.0	24.4	24.8	25.3
60-64	4.3	4.6	5.0	5.4	6.0	6.6	7.2	7.8	8.2	8.5	8.7
65 and above	2.1	2.5	2.8	3.2	3.6	3.9	4.3	4.7	5.2	5.7	6.3
TOTAL*	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

* Percentages may not add to 100.0 due to rounding.

Exhibit VII.10

PROJECTED AGE DISTRIBUTION OF FULL-TIME FACULTY FOR THE YEARS 1980 THROUGH 1990
ASSUMING A 3 PERCENT ANNUAL GROWTH IN TOTAL FACULTY
(Derived From Exhibit VII.7)

Ages of Faculty	Percent of Faculty in Age Group on January 1 of Year										
	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990
22-29	3.3	2.4	2.0	1.8	1.7	1.7	1.7	1.7	1.7	1.7	1.7
30-39	29.6	39.5	38.9	38.3	37.4	36.5	35.5	34.8	34.2	33.7	33.2
40-49	31.6	31.6	31.5	31.4	31-6	31.9	32.4	32.6	32.8	32.9	33.0
50-59	19.0	19.6	20.1	20.5	20.6	20.6	20.6	20.5	20.5	20.4	20.5
60-64	4.3	4.5	4.7	5.0	5.4	5.8	6.2	6.5	6.7	6.7	6.8
65 and Above	2.1	2.4	2.7	3.0	3.2	3.4	3.7	3.9	4.2	4.5	4.9
TOTAL*	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

* Percentages may not add to 100.0 due to rounding.

Exhibit VII.11

PROJECTED AGE DISTRIBUTION OF FULL-TIME FACULTY FOR THE YEARS 1980 THROUGH 1990, ASSUMING A 6 PERCENT ANNUAL GROTH IN TOTAL FACULTY
(Derived From Exhibit VII.8)

Ages of Faculty	Percent of Faculty in Age Group on January 1 of Year										
	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990
22-29	3.3	2.6	2.4	2.3	2.2	2.2	2.2	2.2	2.2	2.2	2.2
30-39	39.6	40.5	41.0	41.3	41.5	41.5	41.4	41.3	41.2	41.0	40.9
40-49	31.6	31.0	30.4	29.8	29.6	29.7	29.9	30.1	30.3	30.6	30.9
50-59	19.0	19.1	19.2	19.1	18.9	18.5	18.1	17.7	17.4	17.1	16.8
60-64	4.3	4.4	4.5	4.7	4.9	5.2	5.4	5.5	5.5	5.5	5.5
65 and Above	2.1	2.3	2.6	2.7	2.9	3.0	3.1	3.2	3.4	3.6	3.8
TOTAL*	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

* Percentages may not add to 100.0 due to rounding.

faculty aged 30 through 39 drop from 39.6 percent of the total to 23.5 percent. Older faculty show a corresponding increase. While faculty aged 50 through 59 increased from 19.0 percent of the total to 25.3 percent, the faculty aged 60 through 64 more than double, and the faculty 65 and over almost treble. This projected shift in the age distribution is presented graphically in Exhibit VII.12.

Exhibit VII.10 presents the projected proportion of faculty in the same age groups under conditions of three percent annual growth. It shows changes that are qualitatively similar, but far less dramatic, than those projected to occur under conditions of no growth. These changes are shown graphically in Exhibit VII.13.

In recent years, the number of faculty has increased at a rate of approximately six percent per year. Exhibit VII.14 shows the proportions of faculty in the age groups projected under an assumed continuation of this growth rate. Under these conditions the projected age composition of the faculty in 1990 is very close to the present age composition.

E. Conclusions

Several of the findings of this study are interesting in terms of increasing our understanding of the dynamics which determine the need for new medical school faculty. The first of these findings is the relatively small proportion of faculty who leave the medical schools specifically for reasons of death or retirement. It was also shown that the majority of faculty leaving the schools are young faculty. This suggests that factors affecting the loss rates of young faculty, such as their opportunities for promotion, could dramatically alter the replacement needs of the schools. A better understanding of the determinants of the loss rates for faculty

Exhibit VII.12

Projected Age Distribution of Full-Time Faculty for the Years 1980 Through 1990
Assuming No Growth in Total Faculty

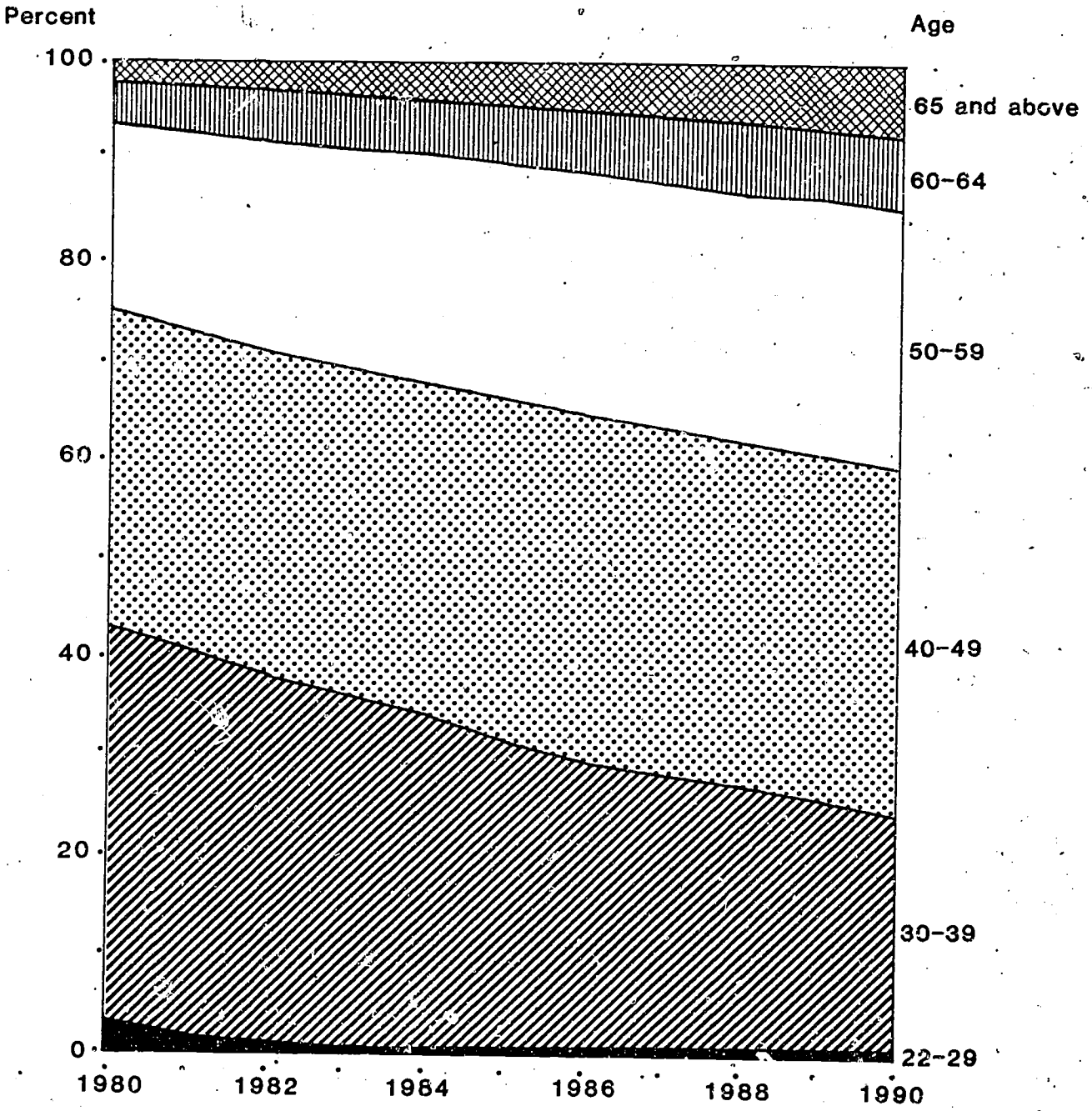
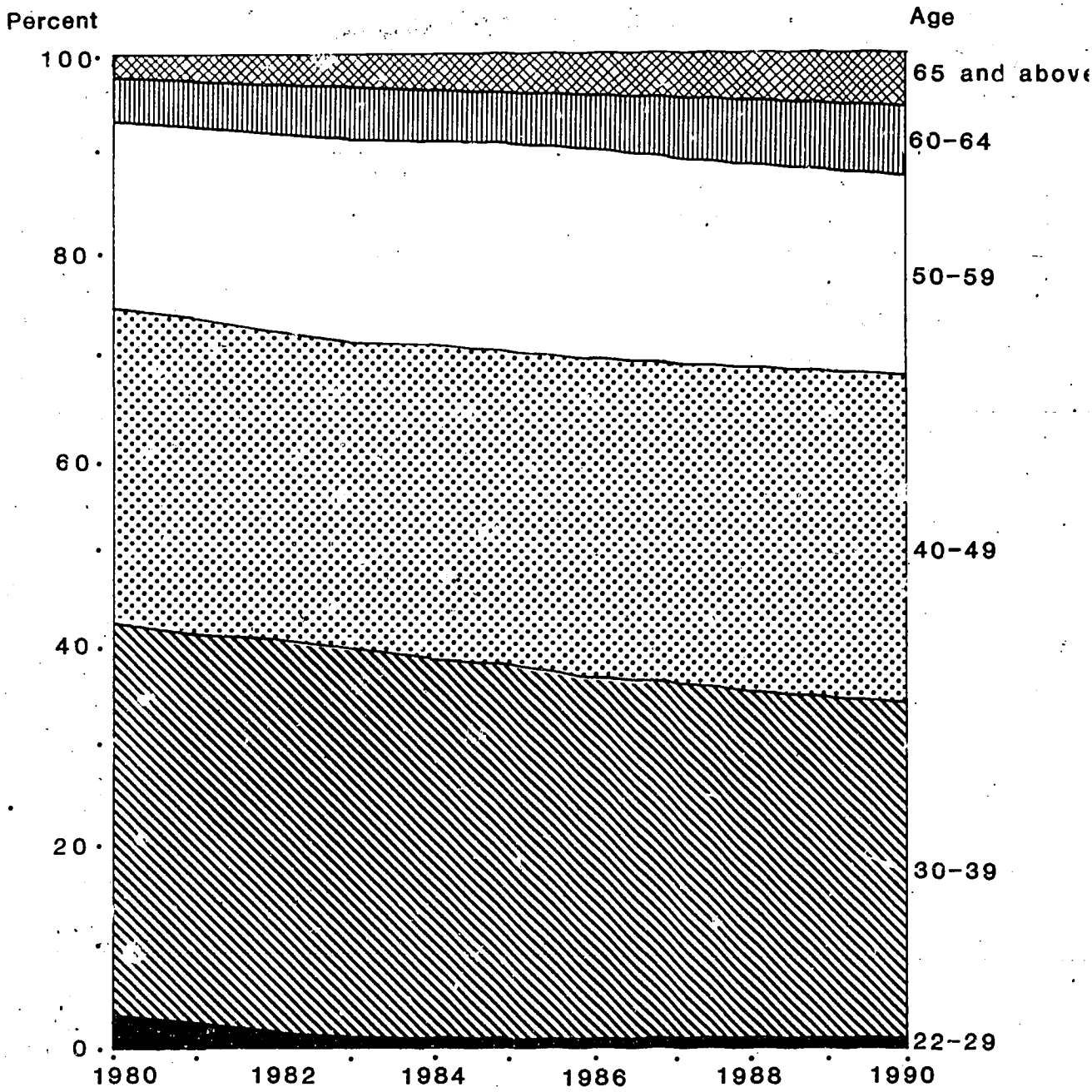
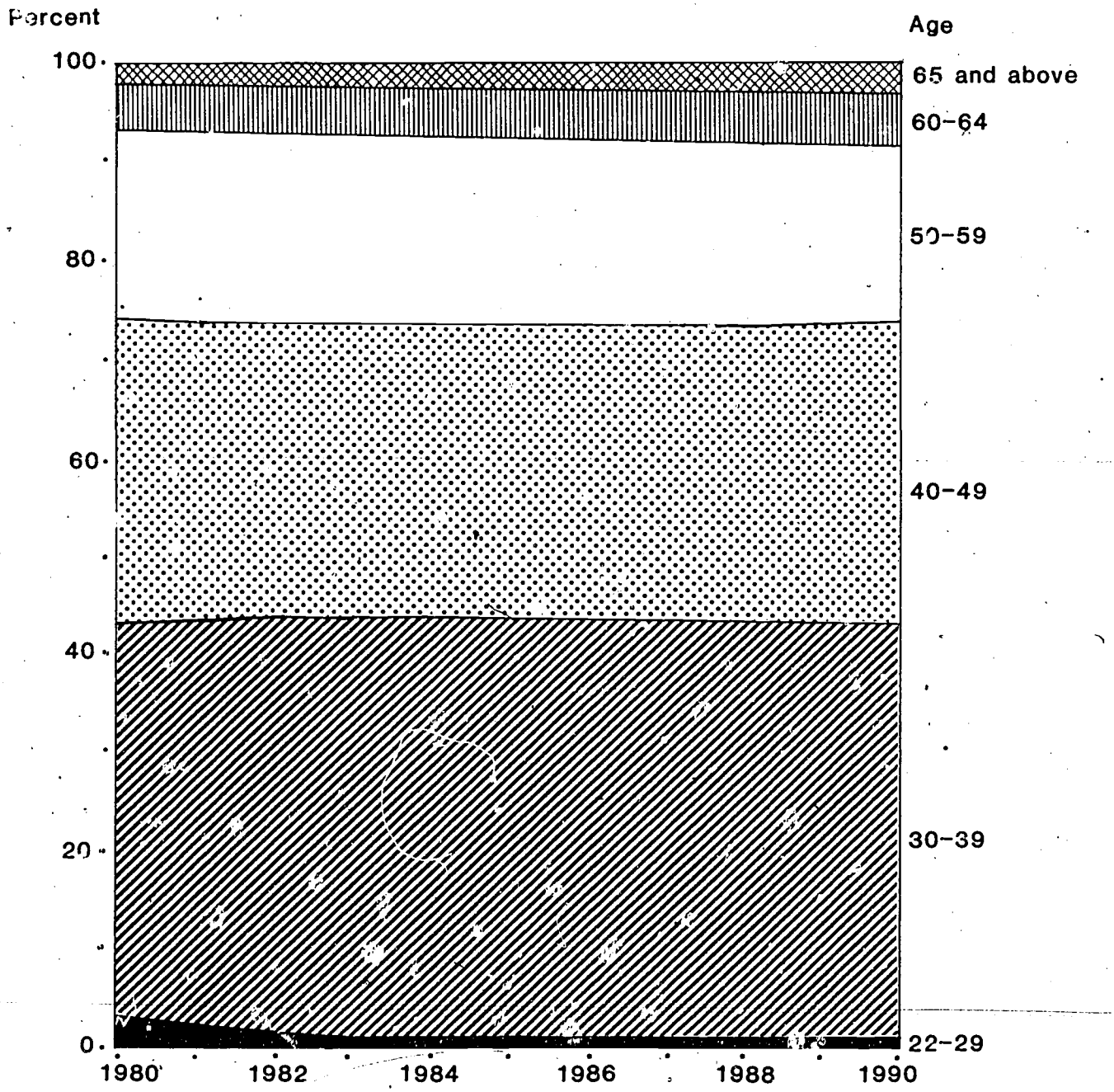


Exhibit VII.13

Projected Age Distribution of Full-Time Faculty for the Years 1980 Through 1990
Assuming a 3% Growth in Total Faculty



Projected Age Distribution of Full-Time Faculty for the Years 1980 Through 1990
Assuming a 6% Growth in Total Faculty



below the age of 40 would greatly increase our ability to understand how these rates may change over the next 10 years. This would allow more accurate assessments of the replacement need generated by the loss of young faculty.

Another interesting finding is the effect of different rates of growth on the future age compositions of the faculty. This analysis indicates that a cessation of growth in the faculty will result in a dramatic shift in its age composition to one that is much older. However, a growth rate of six percent per year, similar to past growth of the medical schools, maintains the age composition of the faculty similar to its current form.

This analysis also showed that much of the need for new medical school faculty is generated by the growth in the size of the faculty. The future growth of the faculty is therefore very important for two reasons. It is not only a major determinant of the need for new faculty but also has a substantial affect on the future age composition of the faculty. A better knowledge of possible future trends in growth would therefore lead to a better understanding of both the needs and nature of the future medical school faculty.

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